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MANUFACTURING METHODS AND TECHNOLOGY (MMT) PROGRAM FOR FY 80 LARGE CALIBER WEAPONS SYSTEM LABORATORY, ARRADCOM

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SEPTEMBER 1980



US ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND
LARGE CALIBER
WEAPON SYSTEMS LABORATORY
DOVER, NEW JERSEY

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18. SUPPLEMENTARY NOTES This project was accomplished as part of the U.S. Army's Manufacturing Methods and Technology Program. The primary objective of this program is to develop, on a timely basis, manufacturing processes, techniques, and equipment for use in production of Army materiel.		
19. KEY WORDS (<i>Continue on reverse side If necessary and identify by block number</i>) MMT - Ammunition Program MMT - Weapons Program		
20. ABSTRACT (<i>Continue on reverse side If necessary and identify by block number</i>) The Manufacturing Methods and Technology (MMT) Program serves the U.S. Army Materiel Development and Readiness Command (DARCOM) as a link between research and development activities and production. The primary aim of the program is to reduce the cost of weapon systems acquisition by improving the efficiency of manufacturing processes and implementing new technology. Although cost reduction is a primary concern, emphasis is also focused on reducing air and water pollution, increasing safety, conserving energy, and reducing dependence on critical materials.		

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INTRODUCTION

The Manufacturing Methods and Technology (MMT) Program serves the United States Army Materiel Development and Readiness Command (DARCOM) as a link between research and development activities and production. The program is designed to reduce the cost of acquiring weapon systems by improving the efficiency of manufacturing processes and implementing new technology. Cost reduction is a primary concern, but reducing air and water pollution, increasing safety, conserving energy, and reducing dependence on critical materials are also emphasized.

The Army's production needs span the full range of modern technology, from the high speed production of millions of small arms to the forging of tank turrets and the production of integrated circuits. Product testing, material handling, and computer-aided design and manufacturing are all within the scope of the MMT Program.

This report presents an overview of ARRADCOM's Large Caliber Weapon Systems Laboratory, MMT Program for FY 80. It contains both the ammunition and weapons appropriations, broken down by responsible division and specific technical area supported.

The definition, scope, items supported, status, and funding are presented. Program management procedures, both internal and external, are also discussed.

The MMT Program Plan is an attempt to provide a single source summary of current and near-term efforts in the DARCOM MMT Program. Since weapon systems requirements and the technology for these systems are constantly changing, inclusion in the plan is not a guarantee that a program will be fully funded or completed. The MMT Program Plan, however, does serve as an indicator of the areas toward which DARCOM's resources will be directed and the magnitude of the Army's commitment to this program.

The MMT Program Plan contains a section for each element which has projects. Each section includes a summary of the activity, its responsibilities, and its major MMT areas. Following the summary is a listing of each project proposed by that activity.

DEFINITION AND SCOPE

An MMT project is one involving the evolution of manufacturing processes, techniques, and equipment by the Government or private industry to provide for timely, reliable, economical, and high quality mass production of DoD-required materiel. Its objective is to bridge the gap between prototype production and mass production by the application of practical new production processes or techniques. It is production oriented, accomplished on a production or pilot production scale, and is expected to result in a practical process for mass application. It does not normally include the application of existing processes, techniques, or equipment to the manufacture of specific systems, components, or end items and is not applicable to a specific weapon system development nor product improvement program (i.e., one which is undertaken to assure that a specific system, subsystem, or component is capable of mass production). Such effort will be normally funded as part of the specific program involved.

MMT projects expand manufacturing technology and translate new technology into practical production processes. They provide advanced manufacturing techniques and processes to support modernization of the industrial base. MMT projects are production-oriented and are expected to result in a practical process for production. They may reduce procurement lead time and costs, provide state-of-the-art production processes and techniques, investigate alternative methods of manufacturing components which limit production (cause bottlenecks), develop new and/or improved processes to facilitate competitive procurement, and/or ensure economic availability of end items. In exceptional cases, they may establish prototype production lines. MMT projects may involve technical or management studies that are related to timely establishment and improvement of manufacturing processes or techniques. These projects have a corollary effect by stimulating and encouraging increased productivity by private industry.

MMT Requirements

The criteria used to select projects for MMT financing are described below:

1. Each project will satisfy a requirement, current or anticipated for specific manufacturing techniques. Future requirements, normally qualitative in nature, will be directed toward the development of manufacturing technology which will increase general productivity.

2. Solutions to the problem will not be available on a timely basis from other programs in either Government or private industry.

3. Feasibility of the effort will have been sufficiently demonstrated by research or laboratory work.

4. The program will create new, significantly improved, or more economical manufacturing processes, techniques, or equipment rather than merely employing existing processes, techniques, equipment or facilities.

5. The program will result in one or more of the following:

a. An improved responsiveness to current and projected requirements.

b. A more effective and efficient industrial base that will reflect modern manufacturing techniques.

c. A cost effective manufacturing technique or process which will ensure economic availability of end items.

d. Enhance safety or anti-pollution measures to meet statutory requirements.

6. The application of the resulting processes, techniques or equipment is generic in nature, i.e., applicable to more than one end item.

Private industry will be encouraged to undertake with its own capital as much of the manufacturing technology effort as possible. When qualified segments of industry will not commit private capital and the program is needed to support Army requirements on an economic and timely basis, then (and only then) will Procurement Appropriation funds be allocated.

To ensure timely MMT developments responsive to Army requirements, process controllers [excluding general purpose automatic data processing equipment (ADPE)] and allied equipment used solely in the manufacturing process will become an integral and inseparable part of the industrial base. Benefits derived from the MMT program, e.g. reduced manufacturing and end-item costs and reduced production lead time, will be such that the program must be actively pursued to optimize the results. MMT projects should be initiated whenever the technical opportunity becomes manifest. MMT

projects which may benefit end items which will be funded initially by Procurement Appropriations should be started in sufficient time to be used in establishing the Initial Production Facilities.

Program Monitoring

Monitoring the MMT Program consists of both formal reports mandated by regulation and informal Laboratory meetings to review specific projects.

Semi-Annual Report

AR 700-90 requires that semi-annual project reports be submitted until the project has been either completed or terminated, at which time the report is considered final. All reports are bound into a series of books for Government distribution and incorporated into a data bank maintained for IBEA. The format for the report is included in appendix A.

Presentation

Approximately every six months, the Munitions Production Base Modernization Agency (MPBM) is briefed on selected projects. Four charts are prepared to MPBM's prescribed format and the presentations are sharply focused on the charts' data. A lengthy technical discussion is not required, but accomplishments and problem areas, as well as the funding status are looked at closely. The charts (app B) consist of:

1. Key Project Information
2. Milestone Schedule
3. Financial Status

Computer Program

Three computer programs (app C) have been developed within the LCWS Laboratory for internal management. These consist of:

1. MMT projects broken down by responsible Division, engineering starting date, and funding distribution.
2. Obligation status of contracts, OGA, and GOCO funds for FY 79 and FY 80.
3. Milestones and monthly starting and completion schedules. Examples of each are inclosed in appendix C.

Additional sources such as the RADMIS Data Bank in System 2000 form and the APARS Report from ARRCOM can be used to extract data on the project status.

Regulations

The regulations governing the MMT program consist of:

1. AR 700-90, Logistics
2. Army Industrial Preparedness Program
3. AR 32-100

MMT AMMUNITION PROGRAM

Background

The Ammunition Program spans the technology gap, particularly in those areas which have no counterpart in private industry. Almost all current manufacturing processes involve manual operations which must be efficiently automated. Batch processes must be converted to continuous processes to accommodate new materials-handling techniques and improve safety.

The Ammunition Program presents unique problems which require innovative solutions. New systems must be capable of economic layaway for periods of ten years or more, a stipulation which is rare in private industry. Manufacturing technology is the foundation of the modern ammunition production facility, whether it is derived from industry or developed through Defense supported projects.

The primary objective of the MMT Program is to improve existing manufacturing processes, techniques, and equipment. The second objective is to bridge the gap between development and full-scale production. The third objective is to solve technological problems.

Current planning requires that, in the event of mobilization, production facilities be activated within three months and reach maximum production in four. This objective requires that equipment design, layaway techniques, and control technology be oriented to achieve the quick-reaction capability desired.

Through advances achieved in automated inspection techniques, loading systems, and assembly systems, the uniformity and quality of the end product has been improved. The munitions MMT program includes several projects oriented toward improving quality control and test technology, and others toward development of explosive loading and assembly techniques and equipment.

MMT projects must be cost effective within the framework and economics of the Five Year Defense Plan. This presents a unique fiscal management challenge in the design and fabrication of equipment and systems required for the loading and assembly of components and end items. This challenge is being met by developing systems with the flexibility to produce any items, establishing an optimum balance between system simplicity and process operational requirements, and providing equipment designs capable of high efficiency operation to achieve cost effective system operations.

Technical Areas

LAP

The MMT effort in the Load, Assemble and Pack (LAP) area is guided by four major program goals: improved economy of operation, improved safety of operating personnel, establishment of a rapid response production capability, and improvements in the quality of the end product. All of these goals must be accomplished within the standards and criteria established for pollution abatement and energy conservation.

Safety

Due to the inherently hazardous nature of munitions production, an extensive program has been undertaken to upgrade the safety of explosive preparation equipment, loading equipment and assembly systems. The MMT program relating to the upgrading of the operational safety of loading lines is a continuation of current efforts. This program will define and investigate specific operational safety hazards and develop equipment and systems to reduce operator exposure and risk.

Metal Parts

The Metal Parts MMT Program has as its goal optimization of manufacturing processes. Projects are included for improving maintainability and readiness through computer integrated manufacturing, computer-aided modeling of forming operations, and storage techniques for production machinery. Enhancing reliability and quality control efforts include analysis for predicting tool failure, improving projectile surface quality, and processing high-frag steel.

Additional Emphasis

Primary program emphasis in energetic materials is being placed on the development of manufacturing technology for new munition items. Recent enactment of the Clean Air Act Amendment and Toxic Substances Control Act has resulted in the requirement for continuous MMT effort to meet mandatory compliance dates. Conserving production base utilities, energy and resources, as well as identifying and using alternate energy sources, are the broad areas of major concern. The development and design of safe, cost effective production processes are major goals of the munitions MMT program. In the supportive technology areas, the primary thrusts continue to be pollution abatement engineering, energy technology development, and explosives and occupational safety.

MMT AMMUNITION PROJECTS

ARRADCOM's FY 80 MMT ammunition projects are itemized in table 1 and discussed below. The specific Division in the Large Caliber Weapon Systems Laboratory responsible for each project is also identified in table 1.

Table 1. FY 80 MMT ammunition projects

<u>Responsible LCWSL division</u>	<u>No.</u>	<u>Project</u>	<u>Cost (\$K)</u>
Energetic Systems Process Division (EPSD)	4000	MMT: Automated M55 Detonator Production Equipment, LAP	250
	4062	Automated Manufacture System for Mortar Increment Containers, LAP	895
	4137	Automated Loading of Center Core Igniters, LAP	67
	4236	Automated Lace Jackets for Center Core Charges, LAP	612
	4312	Injection Molding for Production Explosive Loading, LAP	279
	4469	Automated Insertion of Grenade Layers, LAP	350
	4027	Combined Solvent Recovery /Drying of S-B Propellant, P&E	236
	4033	Caustic Recovery from Sodium Nitrate Sludge, P&E	153
	4037	Process Improvement for Plastic-Bonded Explosives, P&E	236
	4061	Nitroguanidine Process Optimization, P&E	260
	4200	TNT Crystallizer for Large Caliber Munitions, P&E	29
	4210	Jet Cutting of Energetic Materials, P&E	450

Table 1 (cont)

<u>Responsible LCWSL division</u>	<u>No.</u>	<u>Project</u>	<u>Cost (\$K)</u>
ESPD (cont)	4310	DMSO: Recrystallization of HMX/RDX, P&E	278
	4341	Improved Nitrocellulose Purification Process, P&E	583
	4462	Modified FAD for Multi-Base Propellant, P&E	850
	4508	Process Improvement of Pressable RDX Comps, P&E	506
	4285	TNT Equivalency Testing for Safety Engineering, Safety	408
	4288	Explosive Safe Separation & Sensitivity Criteria, Safety	767
	4291	Blast Effects in Munitions Plant Environment, Safety	100
	4281	Conservation of Energy at Army Ammo Plants, Conservation of Energy	1234
	4225	Red Water Pollution Abatement System, Pollution Abatement	155
	4226	On-Line Monitors for Water Pollutants, Pollution Abatement	100
	4231	In-House Reuse of Pollution Abated Waters, Pollution Abatement	250

Table 1 (cont)

<u>Responsible LCWSL division</u>	<u>No.</u>	<u>Project</u>	<u>Cost (\$K)</u>
ESPD (cont)	4309	Ammunition for 120mm Tank Main Armament	3726
Applied Sciences Division	4322	Design Criteria and System Characterization of Electronically Controlled Production Facilities	502
Nuclear and Fuze Division	4266	Manufacturing, Inspection & Test Equipment for Magnetic Power Supply, Fuze	345
Munitions System	4084	Opacity/Mass Emission Correlation, P.A.	111
	4189	High Fragmentation Steel Production Process, MPTS	1048
	4498	Develop Method for Consoli- & Auto Assy of SmallMines, LAP	392
	6736	Technical Readiness Accelerated Through Computer Integrated Mfg (TRACOM) CD/CIM, MPTS	315
	6738	Ultra High Speed Metal Removal, Artillery Shell, MPTS	297

4000 - MMT: Automated M55 Detonator Production Equipment (LAP)
(\$K250)

This is a production engineering measure to develop an automated M55 detonator production capability which will also be adaptable to the production of other initiating devices.

Items Supported

Cartridge, 40 mm: HEDP, M433
Projectile, 155 mm: HE(ICM), M483A1
Projectile, 8 in.: ICM, M509
Detonator, Stab: M55
(Air Force items) CBU2, 25A/A, 46/A, 52/B and 71.

The XM14E6 ADEN/DEFA FA fuze requires a detonator which may be produced on the multi-tooled loader.

Present Status

This is the 10th year of a multi-year project. At the conclusion of this project, an operating prototype will be available for the basic multi-tool loader, automated detonator cup and assembled detonator inspection equipment, automated packaging and pack-out equipment, the automated explosives resupply system, improved powder metering and dispensing devices, an automated detonator painting mechanism, and an improved vacuum system. In addition, final technical reports on the development efforts, RAM data and analysis, and drawings and specifications suitable for the follow-on procurement of equipment will be provided.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
71	333
73	396
74	549
75	100
76	1000
7T	250
77	1000
78	1250
79	1600
81	604 (Tentative)

4062 - MMT: Auto Manufacture System for Mortar Increment Containers (LAP) (\$K 895)

This program will develop an automated system for manufacturing 60 mm M204 and 81 mm M205 propelling charge increment containers. A complete TDP for an automated manufacturing process will be provided enabling the Army to establish mass production capability at either private or GOCO facilities.

Items supported

Cartridge, 60 mm: HE, F/LWCMS, M720
Cartridge, 81 mm: M374A3
Cartridge, Smoke, 81MM: WP, M375A3
Charge, Propelling, 8 in.: WB (Zone 9), M188

Present Status

This is the second year of a three year program. The end products of this project are a pilot production system for manufacture of 60 mm M204 and 81 mm M205 propelling charge increment containers, equipment drawings to complete this system as a prototype and procure additional systems, a complete TDP, hazards analysis, production qualification and technical reports.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
79	507
81	330 (tentative)

4137 - MMT: Automated Loading of Center Core Igniters (LAP) (\$K67)

This project will automate the loading operations of the 155mm M203 and the 8-inch M188 propelling charge igniters with black powder.

Items Supported

Charge, Propelling, 155mm M203

Charge, Propelling, 8 in. M188

Present Status

This is the second year of a two-year program. The end products of this project are a prototype loading machine, a technical data package, including requirements for quality acceptance, and a final technical report.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
FY 79	\$205

4236 - MMT: Auto Lace Jackets for Center Core Charges (LAP) (\$K 612)

Large propelling charges such as the 155mm and 8 in. employ laced jackets to maintain their configurations. The manual threading and tightening of the lacing is a time consuming operation which results in poor quality, non-uniformity, high cost and personnel hazards. The automation/mechanization of the lacing operation would improve quality and greatly lower production costs and hazards.

Items Supported

Charge, Propelling: 155 mm, XM203
Charge, Propelling: 155 mm, XM201 and M119A1
Charge, Propelling, 8 in.: M188

Present Status

This project will result in a prototype production machine with appropriate installation, operation and maintenance manuals for use at an x-facility. Also provided will be a complete set of fabrication drawings and purchase and performance specifications in order to replicate the machine as required. A summary engineering report will provide full developmental data including performance tests, RAM data and hazards analysis.

4312 - MMT: Injection Molding for Production Explosive Loading (LAP) (\$K 279)

This program is intended to develop an injection molding process that will provide an alternative to melt loading of small caliber munitions. The injection molding system will eliminate the

large quantities of riser scrap generated by the current melt loading process. The results of this project will be used to define the base line requirements of an automated injection molding system for on mass production of small caliber munitions on LAP lines.

Items Supported:

BLU 61A/B
BLU 63B
BLU 86
BLU 66B

Present Status

This is the second year of a two-year program.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
79	\$261

4469 - MMT: Automated Insertion of Grenade Layers (LAP) (\$K 350)

This project covers development of an automated system for assembling grenade layers in the M483 ring pack and includes a prove-out plan, preliminary acceptance testing at the contractor's facility, shipment of the equipment to the GOCO, installation and final acceptance testing at the GOCO, preparation of all manuals, and completion of the technical data package.

Items Supported:

Projectile, 155mm: HE, M483A1

Projectile, 8 in.: HE, M509E1

Present Status

This is the last year of a three-year program. The end products of this project will be a component ring pack assembly equipment for M42/M46 grenades contained in the M483/M509 projectiles and automated prototype production equipment which will insert these grenade layers into the M483 projectile and perform all required inspections. In addition, technical data packages for the manufacture of replicate systems will be completed along with a hazards analysis, operation and maintenance manuals and final

reports. Design features which will permit the addition of tooling for the M509 projectile will be included.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
78	\$ 502
79	\$1150

4027 - MMT: Combined Solvent Recovery/Drying of SB Propellant (P&E) (\$K 236)

This project will establish equipment and methods for a combined solvent recovery/drying process with a rapid steeping-water drying method and the use of dehumidified air with partial recycle in the air drying operation.

Items Supported

All single base, solvent-type propellants which are dried with heated air at Radford AAP and at other Government installations. Prominent examples are:

Charge, Propelling, 175mm: WB, M86A2, M6MP Propellant for
Charge, Propelling, 155 mm: WB, M4A2, M1MP Propellant for
Charge, Propelling, 8 in.: M1, M1SP Propellant for

Present Status

This is the first year of a two-year program.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
81	\$383 (tentative)

4033 - MMT: Caustic Recovery from Sodium Nitrate Sludge (P&E) (\$K 153)

The objective of this project is to thermally convert sodium nitrate, formate, and acetate to the oxide which, upon hydrolysis, forms the hydroxide with the evolution of large quantities of heat.

The heat evolved can be used in various phases of production and the hydroxide reused to neutralize the excess nitric acid.

Items Supported

All items containing RDX/HMX and composition explosive thereof, such as

Cartridge 165 mm: HEP
Projectile, 155 mm: HE, ADAM
Rocket, 66 mm: HEAT, 1 LAW (VIPER) Mine, Ground Emplaced,
Scatter, AP, XM74

Present Status

This is the first year of a three-year program.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
81	\$282 (tentative)

4037 - MMT: Process Improvement for Plastic-Bonded Explosives (P&E) (\$K 236)

This project will generate complete design criteria for processes adaptable to the manufacture of PBX compositions at mobilization levels. This project will include the investigation of present processing methods, as well as the application of new technology to coating, drying, and furnishing PBX compositions.

Items Supported

Warhead Guided Missiles
Torpedo Warheads
Burster Charges
Boosters
SOFAR Sound Signal Assembly

Present Status

This is the first year of a three-year project.

4061 - MMT: Nitroguanidine Process Optimization (P&E) (\$K 260)

This project will provide: improved operating conditions; proposed modifications to the existing facility; improved design for future plants; plant operating personnel trained in evolutionary operation; and a functioning EVOP for continued process improvement. Application of EVOP techniques will lead to reduced pollution and energy consumption and more economical operation while maintaining product quality and production requirements.

Items Supported

<u>Prop type</u>	<u>Chg No.</u>	<u>Systems</u>	<u>Code</u>
M30	M490	105mm	A
M30	M353A11	90mm	A
M30	M452A1	105mm	A
M30	M431	90mm	A
M30A1	M203A1	155mm	A

Present Status

This is the first year of a multi-year project. The end products will be applied to existing and future nitroguanidine plants. The EVOP technique may be applied to other facilities.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
81	\$953 (tentative)

4200 - MMT: TNT Crystallizer for Large Caliber Munitions (P&E)
(\$K 29)

This program will develop a continuous TNT crystallizer system for processing slurry of molten TNT containing up to 20% solids. The system will have the capability to closely control the percentage of solids incorporated into the molten TNT and the temperature of the explosive prior to the pour operation. This system will also eliminate double probing and top off operations which are required for processing TNT on a batch basis. The project will identify new crystallizer systems. Process parameters will be defined for the Army's alternate preferred filler in high-explosive loaded artillery ammunition.

Items Supported

Projectile, 155mm, HE: RA, M549A1
Projectile, 155mm, HE: XM795
Projectile, 8 in., HE: M106
Projectile, 8 in., HE: RAP, M650

Present Status

This is the first year of a two-year program. The result of this PEM program will be used to define the procedures for processing TNT explosives on a continuous basis in the melt-pour system for mass production LAP Lines.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
FY 81	\$448 (tentative)

4210 - MMT: Jet Cutting of Energetic Materials (P&E) (\$K 450)

This project will include the procurement, installation, and evaluation of an optimum jet cutter comprised of several components. Auxiliary safety interlocks, sprinkler protection, safety fire doors, and feed and take-away conveyor systems will be designed and debugged. Use of common drying trays is planned to reduce the number of operations. Strand chipping will be greatly reduced, probably eliminating hand sorting. Redrying will be minimized or eliminated. Elimination of these time consuming hand operations will result in cost savings. The proposed process will be inherently safer than the existing process, since it is conducted remotely and the sharpness of the "tool" is no longer a factor.

Items Supported:

Cartridge, 105 mm, APDS-T: M728/M392A2
Cartridge, 105 mm, TP-T: M490
Cartridge, 105 mm, TPDS-T: M724A1
Cartridge, 105 mm, APFSDS-T: M735
Cartridge, 105 mm: M119

Present Status

The end products of the program are a prototype jet cutting facility for benite production. In addition, a final report will be issued which will include a hazard analysis study, the results

of acceptance and non-ballistic qualification tests of a pilot lot of benite, and a summary of findings of reliability, acceptability, and maintainability (RAM) studies.

4310 - MMT: DMSO Recrystallization of HMX/RDX (P&E) (\$K 278)

Dimethylsulfoxide (DMSO) has significantly greater solvating power than the presently used solvents, cyclohexanone and acetone, and, therefore, can be used very efficiently in recrystallizing large quantities of RDX and HMX in minimal time, by yielding a significantly greater throughput of product. From preliminary results and analysis of laboratory-produced material, DMSO recrystallized RDX and HMX crystals are chemically and physically equivalent to those obtained with the presently used production solvents. Work to be conducted under the FY 80 segment of this multi-year funded project will involve interim qualifications, loading studies, and end item testing of explosives formulated from DMSO-recrystallized RDX/HMX produced in HSAAP's pilot-scale continuous recrystallization plant.

Items Supported

All end items containing RDX and/or HMX, or compositions thereof, of which the following are examples:

Projectile, 155mm, HE, ICM, ADAM: XM731
Cartridge, 165mm, HEP
Rocket, 66mm, HEP
Rocket, 66mm, HEAT: ILAW (VIPER)
Mine, Ground Emplaced, Scatter, AP: XM74

Present Status

This is the last year of a six-year program. The end product is a pilot plant for the development of improved recrystallization procedures to be built at HSAAP. A Technical Data Package will be generated by ARRADCOM and Holston AAP.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
75	465
76	400
77	200
78	196
79	483

4341 - MMT: Improved Nitrocellulose Purification Process (P&E)
(\$K 583)

This project will evaluate the prototype equipment in the poaching and acid boil operations. The production of pilot lots followed by ballistic evaluation will be made. Process design criteria will be established and the final report prepared.

Items Supported

Nitrocellulose and all single- and multi-base propellants.

Present Status

This is the last year of a four-year project. This project will provide preliminary design criteria for modernized purification processes and a technical report detailing results, hazards analysis, RAM assessment, Quality Assurance Plan and a prototype 2000 lb/hr continuous purification process. This work will be implemented in follow-on facility projects.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
77	165
78	664.9
79	742
81	765 (tentative)

4462 - MMT: Modernized FAD for Multi-Base Propellants (P&E)
(\$K 850)

Prior funding for this project provided for an engineering data review, hazards analysis, quality assurance, procurement of prototype equipment, building modification, process data acquisition, and installation and evaluation of equipment. This funding will provide for additional equipment, procurement, installation and evaluation, preliminary facility design criteria, documentation and final report and Control System Functional Criteria.

Items Supported:

<u>Propellant</u>	<u>Round</u>	<u>System</u>
M30A1	Cartridge, 155 mm: M203A1	105 mm Gun
M26E1	Cartridge, 152 mm, TP-T: M411A3	152 mm
M330HBD	Cartridge, 105 mm, HEAT-T (FFAIS): M456A1E2 and M496	105 mm Gun
M30	Cartridge, 105 mm, HEAT-T (FFAIS): M456A1	105 mm Gun
M30MOD	Charge, Propelling, 8 in.: XM188E3	8 in. Howitzer

Present Status

This is the last year of a four-year program. End items of this project will be technical reports, test data, prototype equipment, technical data package and preliminary design criteria, including Control System Functional Criteria for modernizing other forced air drying houses.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
77	163
78	592
79	528

4508 - MMT: Process Improvement of Pressable RDX Compositions (P&E) (\$K 506)

This project will generate complete design criteria for incorporation of facilities with processes sufficiently adjustable for the manufacture of pressable RDX compositions (A3, A4, A5) at mobilization levels. This project will include the investigation of present methods of incorporating RDX compositions.

Items Supported

All items containing pressable RDX compositions, of which the following are examples:

Projectile, 8 in.: HE
Projectile, 155mm: HE, RAP
Cartridge, 20mm: All Types
Cartridge, 165mm: HEP
Rocket, 66mm: HEAT-T

Present Status

This is the last year of a three-year project. The end results will include a final technical report containing all the results gained from this project and sufficient engineering information to design new improved production facilities and a complete description of new methods, equipment, and technology for processing these explosives.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
78	300
79	357
81	263 (tentative)

4285 - MMT: TNT Equivalency Testing for Safety Engineering (Safety) (\$K 408)

The only currently available design criteria for structures which can resist the effects of HE explosions is based on surface bursts of hemispherical TNT. When designing a structure to withstand the blast output of some other energetic material or charge shape, the designer must be able to convert the loading given in the TNT design manual into information which is pertinent for the material in question. Testing to generate peak pressure and positive impulse data from blast measurements of a variety of high energy materials (propellants and explosives) will solve this problem. These results will be compared with the blast output of surface bursts of hemispherical TNT in order to determine the TNT equivalency of the material. Work to be performed under this project includes: analytical studies, test plan development, testing, evaluation, and safety echelon approval of the TNT equivalency of various high energy materials (propellants and explosives).

Items Supported

This project is applicable to explosives, propellants, high-energy systems and munition end-items (projectiles, warheads, fuzes, missiles, etc.).

Present Status

This project is in the sixth year of an eight-year program. The end products are: TNT equivalencies, design data, test methods, and technical reports.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
76	325
7T	81
77	377.6
78	394.6
79	420
81	441 (tentative)

4288 - MMT: Explosive Safe Separation and Sensitivity Criteria (Safety) (\$K767)

Tests will be designed for various explosives and explosive end items and the results will be used to establish:

1. Safe separation distances for explosives, end items, and in-process materials.
2. Critical and safe depths of bulk explosives on a conveyor or storage vessel.
3. Sensitivity of explosives at various stages of the manufacturing process to primary and secondary fragment impact.

The program involves test plan development, testing, test data evaluation, and report preparation prior to modifying regulatory documents.

Items Supported

This project is applicable to the manufacture of all explosives, propellants, and explosive end items.

Present Status

This is the sixth year of a seven-year program. The data generated, with safety echelon approval, will be used to modify or supplement present regulatory manuals TM 5-1300 and AMCR 385-100.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
76	592.8
7T	139.3
77	600
78	816.3
79	643
81	720 (tentative)

4291 - MMT: Blast Effects in the Munition Plant Environment (Safety) (\$K 100)

This project is divided into two tasks. In Task 1, Blast Effects and Loadings, the characteristics of the blast environment which affect a structure's response are studied. In Task 2, Structural Response and Design, the response of various structural materials and elements subjected to the loadings determined in Task 1 are determined. This project will facilitate the design of blast resistant protective structures.

Items Supported

This project is applicable to all explosives and explosives-like hazardous materials, manufacturing, LAP and storage facilities. The following near-term projects will be supported:

- Project 823142W, Mississippi, 155 mm: LCM Complex
- Project 83B043, Government Facility, 30 mm: GAU-8 Cartridge, equipment and building
- Project 833556, Government Facility, 155 mm/8 inch, 3D Propellant Charge Bog LAP
- Project 83B053, Sunflower, AAP Projectile, 155 mm, RAP: M549
- Project 832607, Badger AAP, Semi-Auto single base line
- Project 83B053, Holson AAP, Granular Composition B
- Project 832665, Radford AAP, Continuous NC MFG Unit

Present Status: This is the fourth year of a five-year program. The end product of this project will be design guidance and construction techniques that will establish a capability to design acceptable structures that will provide protection to workers from blast and fragment damage resulting from an accidental explosion at an ammunition plant.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
76	700
77	350
79	235

4281 - MMT: Conservation of Energy at Army Ammunition Plants (Conservation of Energy) (\$K 1,234)

Methods for more efficient energy utilization at Army Ammunition Plants will be determined. These measures will be immediate or short-term applications of current technology to the various industrial processes at the plants. This effect will also determine technology requirements as it relates to explosives and propellant operations where immediate or short-term technology is not considered adequate. Efforts will be conducted to develop advanced technology in discrete segments based on potential economic payback to develop energy conservation methods.

Items Supported

This program will support all munitions items containing propellants, explosives and/or pyrotechnic materials and all related manufacturing, loading, and assembly plants.

Present Status

This program, which is in its sixth year, will produce energy inventories/balances of specific unit processes, technical reports on the various subprojects, and recommendations stating where, what, and how much energy can be conserved.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
75	191
76	875
77	997.7
78	1059.5
79	1285
81	1207 (tentative)

4225 - MMT: Red Water Pollution Abatement System (Pollution Abatement) (\$K 155)

Based assessment of current technologies, the Sonoco Sulfite Recovery Process (SSRP) was selected to eliminate pollution in streams and recover sodium sulfite from red water for reuse in the purification of TNT. Feasibility of this process has been demonstrated; however, additional MMT efforts are required to establish the optimum operating parameters of critical components such as the pelletizer, reduction kiln and scrubber, and to develop and optimize methods for clarifying and purifying the final product. These efforts will directly support an MCA project for Radford Army Ammunition Plant.

Items Supported

This project will support production of TNT.

Present Status

The end products of this project are:

1. Design data for MCA project at Radford Army Ammunition Plant, and plans for implementation at other TNT facilities containing, in addition to design data, hazard, and economic analysis.
2. A final technical report, which will produce the technical data for an optimum modular system for use at all TNT plants.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
79	350
81	160 (tentative)

4226 - MMT: On-Line Monitors for Water Pollutants (Pollution Abatement) (\$K 100)

This program will rank instruments for suitability in monitoring a particular pollutant in a particular waste stream, demonstrate the capabilities of the alternatives, consider the cost benefit ratios, develop design parameters for a simpler, more economical instrument dedicated to monitoring a specific pollutant, and evaluate the feasibility of using the instruments for automatic control of pollution abatement equipment.

Items Supported

This project will support all explosives and propellant items whose manufacture requires the monitoring of water pollution.

Present Status

This is the first year of a two-year program. The end products will be the selection of monitoring instruments for military pollutants in the waste waters from ammunition plants; designs for more economical instruments for monitoring a particular pollutant in a particular waste stream.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
81	379 (tentative)

4231 - In-Plant Reuse of Pollution Abated Waters (Pollution Abatement) (\$K 250)

The most direct way to achieve zero discharge of pollutants is not to discharge plant effluent in the first place. This concept combines abatement of waste water contamination by current state-of-the-art treatment with recycle and reuse of the abated waste water within the plant itself. The treatment plant (secondary) would be reduced as a result of the application of the water management principles or recycle, reuse and product recovery to the manufacturing processes. The abated effluent would be recycled within the plant wherever the pollutant level will not adversely affect the manufacturing process. Any remaining effluent would get tertiary treatment (carbon adsorption or ion exchange) in a unit of greatly diminished size and would be recycled within the plant.

Items Supported

This project will support all munition items containing propellants and/or explosives and related LAP operations.

Present Status

This is the first year of a two-year program. The end products technical reports and technical data in support of design criteria for the establishment of cost effective pollution abatement systems based on in-plant reuse of pollution abated waters.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
81	465 (tentative)

4309 - MMT: Ammunition for 120 mm tank Main Armament (\$K 3726)

This MMT effort involves the application of new and/or more efficient manufacturing methods, techniques, and processes developed under laboratory conditions and techniques in practice now in Germany's production of 120 mm ammunition. This project will assist in adapting the the 120 mm tank main gun systems based on a German design for use as the future main armament on the SMC tank. The tasks to be accomplished are: (1) the transfer of design technology from the German to the American form for use in (2) fabrication and testing the 120 mm tank gun and ammunition system in the United States, and (3) mass production of ammunition to meet mobilization requirements.

Items Supported:

Cartridge, 120 mm, APFSDS-T: XM827
Cartridge, 120 mm, FSMP-T: XM828
Cartridge, 120 mm, APFSDS-T: XM829
Cartridge, 120 mm, HEAT-MP-T: XM830
Cartridge, 120 mm, TP-T: XM831
Cartridge, 120 mm, TPDS-T: XM 832

Present Status

The end products of this project are the technology, procedures and manufacturing knowledge to make the manufacture of the 120mm Tank Gun Ammunition to United States production standards in American industrial facilities.

This is the second year of a multi-year project. The tasks which are to be accomplished during FY 80 in order of priority are:

<u>Task</u>	<u>Subject</u>
1	Develop Manufacturing Methods for Stick and JA-2 Propellant
2	Explosive Loading of 120mm HEAT-MP Projectile
9	Investigation of Forming and Heat Treatment
10	Precision Forming of Tail Fin
6	Molding of Rear Seal
3	Development of Assembly Process

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
79	795.5
81	3988 (tentative)

4322 - MMT: Design/Criteria and System Characterization of Electronically Controlled Production Facilities (MPTS) (\$K 502)

Characterization data and design criteria must be generated to define the effects of dormant degradation on the reliability and safety of industrial electronic systems, in use or being designed, for modern ammunition facilities. The required engineering data will reflect degradation and failure mechanisms in MMT pilot facilities and full scale production systems acquired under the Ammunition Production Base Program, and through contacts with industry and other Government sources. In addition, advanced technology components and sub-systems will be procured and evaluated to fill data gaps left by the study of existing systems. Complementary data will be acquired from the ammunition facility proveout and maintenance of laid-away facilities programs. These data will be used as the basis for designing future systems and retrofitting existing systems which cannot meet production lead-time schedules. Maintenance engineering data generated by the program will be incorporated in documents for those systems now under construction or being designed, and will serve as source data for improved maintenance of fielded systems.

Items Supported

The data generated will be invaluable to a broad range of current and projected electronic and electro/optic controlled production systems. Over 85% of all ammunition facilities planned for construction during FY 80 through 84 time frame will use the technology developed in this project.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
78	185
79	609

Items Supported

Examples of items being produced or scheduled for procurement are:

FASCAM Munitions
COMP B
Multi-Base Propellants
ICM Munitions
XM650/M549 RAP
TNT
Single Base Propellant
Tank Ammo (all types)
20 mm, 30 mm, and 40 mm Ammo
XM795, XM711 Conventional HE Projectiles
Solventless Propellant
5.56 mm and 7.62 mm Cartridges

Present Status

This is the last year of a three-year program. The source data and technology developed on this program are directed at non-operating environments on the class of industrial hardware used in electronic and electro-optic production control systems in the plant modernization program. Primary products are: (1) A technology base which assures that the manufacturing capability is not degraded by dormancy; (2) Documentation of design requirements and procedural guidelines which ensure readiness of present and future modernization projects; (3) A test program which can be conducted at existing Army facilities on hardware that is not in use to enhance early development of technology; and (4) A base for adjusting and/or verifying current spare parts provisioning.

4266 - MMT: Manufacturing, Inspection and Test Equipment for Magnetic Power Supply (Fuze) (\$K 345)

The improvement of the M456A1 HEAT cartridge includes changing the location of the power supply from the projectile nose to the PIBD fuze housing and changing it to a magnetic pulse, generating-type power supply which is unaffected by shock vibrations. The manufacturing, inspection, and test methods, and the technology required to produce the magnetic power supply will be developed during a two-year MMT program. This type of power supply, which is used in other munitions such as guided missiles (larger and withstanding relatively lower gravitational forces), has never been produced in the size and quantity required for artillery, tank, and mortar ammunition. The methods and technology developed will

accommodate full or partial automation as quantity and costs dictate. The MMT program will also be applicable to future generation HEAT ammunition such as 105 mm cartridge HEAT-MP-T XM815.

Items Supported

PIBD Fuze for HEAT Ammunition

Present Status

This is the first year of a two-year program. The GOCO hardware and equipment acquired under this project will provide for automated or semi-automated production of magnetic power supplies at a cycle rate of 10 seconds. Additional end products will be manufacturing, inspection and testing data, and a final report. This power supply can be used for other products, and incorporated in future designs. Its adaptable size and modular construction make it an "off-the-shelf" item for a multitude of applications. Ease in manufacturing, resulting from this effort, will increase its potential for future use.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
81	759 (tentative)

4084 - MMT: Opacity/Mass Emission Correlation (Pollution Abatement) (\$K 111)

Given the proper development, there is a reasonable expectation that an available and inexpensive opacity monitor can be used to measure and record mass as well as opacity. What is needed is the correlation between opacity reading and the mass emission rate. With this correlation and an opacity monitor, AAP's will be well suited to meet the new EPA regulations.

Items Supported

Large Caliber Production.

Present Status

This is the last year of a two-year program. The end products of this project will be correlation charts developed on site at the AAP's which will convert opacity readings to mass emission rates. A report will be prepared and published. The major effort of this

project will, therefore, be evaluation and correlation of available equipment to monitor opacity and mass emissions.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
75	465
76	400
77	200
78	196
79	483

4189 - MMT: High Fragmentation Steel Production Process (MPTS) (\$K 1048)

New and improved production processes and techniques will be examined and refined relative to the manufacture of high fragmentation steel projectile parts. General areas of study will include reduction of starting multi-weight via forge tooling designs, optimizing of machining techniques, determining necessity to spheroize anneal forgings, refining of hot nosing process with follow-up stress relief of nosed bodies, examining various heat treatments, and determining of new fracture toughness test. All projectile metal parts will be processed to their finished state in order to evaluate all fabrication processes and inspectability with investigation of problems encountered and improvements made where possible. The 155mm XM795 will be the test vehicle for this work.

Items Supported

All large caliber ammunition from 120 mm to 8 in., with components manufactured from high fragmentation steel.

Present Status

This is the second year of a four-year program. The end products of this project are: (1) Improved, economical processes for manufacturing high-fragmentation steel parts which have generic application to 120 mm through 8-in. projectiles; (2) comprehensive data bank on processing high-fragmentation steel; (3) reliable, economical fracture-toughness test for incorporation into TDP's of high fragmentation-steel parts.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
79	533
81	1153 (tentative)

4498 - MMT: Develop Method for Consolidation and Automated Assembly of Small Mines (LAPS) (\$K 392)

A study will be made of the LAP procedures for each of the three mine systems (RAAM, GEMSS, GATOR) to determine the extent of automation for each operation. A technical review will be conducted after the study phase before the detail design. Prototype equipment will be developed, built, installed, and proved out at Iowa AAP.

Items Supported

RAAM M70 AT Mine Program

GEMSS Scatterable Mine System XM74 (AP) and XM75 (AT) Mines
GATOR CBU78; CBU84

Present Status

This is the last year of a three-year project. This project will provide technical data packages, LAP process procedures, automated inspections, and prototype equipment for LAP operations.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
78	325
79	572

6736 - MMT: Technical Readiness Accelerated through Computer Integrated Manufacturing (TRACIM) CAD/CIM (MPTS) (\$K 315)

The development and implementation of a Computer Integrated Manufacturing (CIM) system involving interactive graphics and numerical control machine tools will significantly reduce the requirement for highly skilled manufacturing craftsmen. Also, a computer data bank, based on Group Technology techniques and maintained in a ready status, will provide management and engineers

immediate access to the very latest data required for a rapid build-up to maximum planned schedules.

Items Supported

155 mm family of artillery ammunition, 8-in. family of artillery ammunition, 105 mm tank round. This technology may be extended later to small arms and other artillery systems.

Present Status

This is the last year of a four-year program. A comprehensive CIM system will be developed and demonstrated on samples of ongoing metal parts and items in the planning stage. The system will be suitable for application to the entire spectrum of ammunition design and manufacture.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
76	400
78	100
79	256

6738 - MMT: Ultra High-Speed Metal Removal, Artillery Shell (MPTS) (\$K 297)

Removal of metal at high rates of speed requires large quantities of equipment to accomplish a particular machining operation. The solution to this problem is to investigate another technique for high speed metal removal. Achieving increased metal removal, which will be investigated under this project, has been limited to plasma-arc-assisted machining which increases productivity significantly.

Items Supported

This project will support all artillery and mortar projectile metal parts.

Present Status

This is the last year of a two-year program. The end product will be the development of a manufacturing method and technology that can be used for machining steel at metal removal rates significantly higher than current rates and at reduced production costs.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
79	181

MMT WEAPONS PROGRAM

The main emphasis of the MMT weapons program is the modernization and upgrading of operations. The purpose is to reduce costs and improve product quality by taking advantage of advances in metal working technology.

Since most items produced at Watervliet Arsenal are complex and/or require close tolerances, the setup and movement time are important cost factors. While it is not economical or practical to develop an integrated material handling system for Watervliet, extensive savings can be realized through improvement of present methods.

Another major cost factor is the machining of items to final shape. Since the alloys used in weapons are expensive and difficult to work with, producing components close to final shape will reduce the cost and time required for finishing. Projects are also proposed to improve the metal removal process.

Improved metal working methods and increased use of computer-aided manufacturing are major production trends. The results of the projects in this area are expected to hold significant interest for other producers, in both government and private industry. These projects will also be important in modernizing and upgrading contractor facilities, many of which are seriously outdated.

MMT WEAPONS PROJECTS

ARRADCOM's FY 80 MMT weapons projects are itemized in table 2 and discussed below.

Table 2. FY 80 MMT weapons projects

<u>Responsible LCWSL division</u>	<u>No.</u>	<u>Project</u>	<u>Cost (\$K)</u>
Benet Weapons Laboratory	7730	Manufacture of Split Ring Breech Seals, MPTS	453
	7920	Conservation of Critical Materials for Gun Tubes, MPTS	236
	7925	MMT: Bore Evacuator Boring, MPTS	111
	7926	MMT: Hot Isostatic Pressing (HIP) of Large Ordnance Components, MPTS	216
	7927	MMT: Generation of Base Machining Surfaces, MPTS	86
	7928	MMT: Robotized Benchng Operations (CAM), MPTS	113
	8024	MMT: High Speed Abrasive Belt Grinding, MPTS	324
	8026	MMT: Application of Synthetic Quenchants to Gun Tubes and Heavy Weapon Components, MPTS	143
	8047	MMT: Pass Through Steady Rests for Tube Turning, MPTS	269
	8105	MMT: Establish Rough Thread Blanks, 8 in. M201 Bushing, MPTS	88
	8106	MMT: Large Caliber Powder Chamber Boring, MPTS	59
	8107	MMT: Creep Feed Crush Form Grinding, MPTS	348
	8208	MMT: Material Handling, MPTS	113
	8341	MMT: Hollow Cylinder Cut Off Machine, MPTS	69
8342	8342	MMT: Keyway Milling Machine, MPTS	242
	8057	MMT: Dual Rifling Broach Removal System, MPTS	215
	8059	MMT: Salvage of Cannon Components by Electrodeposition, MPTS	152
	8060	MMT: Improved Manufacturing Processes Related to Final Inspection of Cannon Tubes, MPTS	268

7730 - MMT: Manufacture of Split Ring Breech Seals (MPTS) (\$K 453)

Automated and improved procedures will be adopted which will minimize hand finishing operations negate the need of highly skilled operators, and reduce cost. This project will perfect up-to-date automated machinery, tooling, and modern techniques to manufacture split rings to design specifications with little or no rejection. Split rings cannot be made in PEP lines at this time since the present procedures require highly skilled personnel. The proposed solution would resolve this problem.

Items Supported

<u>Item</u>	<u>Weapons system</u>
Cannon, 155 mm Howitzer: M185	Howitzer, Medium S.P., 155 mm: M109A1
Cannon, 175 mm GUN: M113E1	Gun, Field Artillery S.P., 175 mm: MWT
Cannon, 155mm Howitzer: M199	Howitzer, Medium Towed, 155 mm:
Cannon, 155mm Howitzer: M1A1	Howitzer, Medium Towed, 155 mm: M114, M114A1
Cannon, 8 in. Howitzer: M201	Howitzer, Heavy S.P., 8 in.: M110A1

Present Status

The end products will consist of new automated manufacturing equipment, tooling, and techniques to manufacture split rings at a reduced cost. In addition, designs of machinery, operating conditions, i.e., speeds, feeds, tooling and all the necessary information to implement the newly developed techniques will be compiled into a complete package.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
79	148

7920-MMT: Conservation of Critical Materials for Gun Tubes (MPTS)
(\$K 236)

The implementation of this project will reduce reliance on foreign sources for critical materials. This is especially important since it is predicted that the use of chromium for stainless

steel will increase in the future, while supplies decrease. Decreasing reliance on the critical alloys will ensure a steady supply of material for tubes, and decrease their cost. This project will generate the necessary processing modifications to allow the use of alloy steels with lower critical alloys.

Items Supported

<u>Item</u>	<u>Weapons system</u>
Cannon, 81 mm Mortar: M29A1	Mortar, Infantry, 81 mm: M29A1, W/E
Cannon, 90 mm Gun: M41	Tank, Combat F.T., 90 mm: M48, M48A3
Cannon, 105 mm Howitzer: M2A1-M2A2	Howitzer, Lt. Towed, 105 mm: M101, M101A1
Cannon, 105 mm Howitzer: M137-M137A1	Howitzer, Lt. Towed, 105 mm: M102
Cannon, 105 mm, Gun: M68	Tank, Combat F.T., 105 mm: M60, M60A1
Cannon, 105 mm, Howitzer: XM205	Howitzer, Lt. Towed, 105 mm: XM204
Cannon, 4.2 in. Mortar: M30	Mortar, 5.2 in.: M30, W/E (Cannon, M30/Mount M24 or M24A1 ARAAV
Cannon, 152 mm, Gun Launcher: M81E1	Howitzer, Med, S.P., 155 mm: M109A1
Cannon, 155 mm, Howitzer: M185	Howitzer, Med Towed, 155 mm: M114, M114A1
Cannon, 155 mm, Howitzer: M1-M1A1	Howitzer, Med Towed, 155 mm: M198
Cannon, 155 mm, Howitzer: M199	Tank, Combat F.T., 152 mm Gun: M60A2
Cannon, 152 mm, Gun, Launcher: M162	Gun, Field Artillery S.P., 175 mm: M107
Cannon, 175 mm, Gun: M113-M113A1	Howitzer, Heavy S.P., 8 in.: M10/M110A1
Cannon, 8 in. Howitzer: M2A2/M201	Rifle, 90 mm: M67, W/E
Rifle, Recoil, 90 mm: M67	Cannon, 106 mm, Rifle, Recoil: M206
Rifle, Recoil, 106 mm: M40A2, M40A4	Cannon, 106 mm, Rifle, Recoil, M206A1
Rifle, Recoil, 106 mm, M40A3, M40A5	

Present Status

Processing parameters will be established which allow the use of alloy steels with less critical alloying material.

7925 - MMT: Bore Evacuator Boring (MPTS) (\$K 111)

A special purpose machine and tooling package providing a head for each end of the evacuator chamber will be developed to produce both bores simultaneously. If both surfaces were produced from the same setup, orientation of the centerlines would be automatically assured. A form mill similar to a hob is envisioned as the tooling so that, when the bore diameter is complete, all other features of the bore will meet their dimensional requirements.

Items Supported

<u>Item</u>	<u>Weapons system</u>
Cannon, 105 mm Gun: M68	Tank, Combat F.T., 105 mm Gun: M60 and M60A1
Cannon, 155mm, Howitzer: M185	Howitzer, Med S.P., 155 mm: M109A1

Present Status

The end product of this project will be the design, testing, and procurement of a special purpose machine for the 105mm, M68 bore evacuator and a machine capable of accepting tooling for all in-line bore chambers.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
81	248 (tentative)

7926 - MMT: Hot Isostatic Pressing (HIP) of Large Ordnance Components (MPTS) (\$K 216)

By using HIP, it is possible to fabricate breech blocks closer to the final shape than the currently used forging. This method has been in use since the 1950's, but for many years the equipment required discouraged production use of the process. Improvements in pressure vessel and furnace design have now brought the HIP process to a very practical production process.

Items Supported

<u>Item</u>	<u>Weapons system</u>
Cannon, 8 in. Howitzer: M201	Howitzer, Hy S.P., 8 in.: M110A1
Cannon, 175mm, Gun: M113	Gun, F.A., S.P., 175mm: M107
Cannon, 8 in. Howitzer: M2A2	Howitzer, Hy, S.P., 8 in.: M110

Present Status

The end products of this effort will be a complete production technique capable of producing a step thread type breech block using the HIP process and a technical report.

7927 - MMT: Generation of Base Machining Surfaces (MPTS) (\$K 86)

A procedure will be developed to combine a setup technique with an efficient machining process for rough forgings and castings. The new process will replace the present method of setting up and laying out the work in one area, then performing an equivalent setup on a machine and the conventional machining of working surfaces to layout lines in another area. Preset optical comparator layouts and/or preset height gaging will be employed to set up the first cuts directly on the machine on a one time basis. On evaluation of these processes, the advantages will be adopted and the necessary fixtures and tools purchased and applied to the 105mm M68 breech ring production line.

Items Supported

<u>Item</u>	<u>Weapons system</u>
Cannon, 175mm, Gun: M113A1	Gun, Field Artillery, S.P., 175 mm, M107
Cannon, 8 in. Howitzer: M201	Howitzer, Heavy S.P.: M110E2
Cannon 155mm Howitzer: M185	Howitzer, Med, S.P., 155 mm: M109A1
Cannon, 105mm, Gun: M68	Tank, Combat, F.T., 105 mm, Gun: M60 and M60A1

Present Status

The primary end product will be equipment capable of generating first cut surfaces. In addition, a formal technical report

showing complete economic and technical results will be written and circulated to responsible manufacturing operating personnel.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
81	137 (tentative)

7928 - MMT: Robotized Benching Operations (CAM) (MPTS) (\$K 113)

In benching operations, breech rings and breech blocks in particular, an industrial robot will be used in manufacturing operations that are too hazardous, boring, or uneconomical for humans. With a robot in control, the hazardous aspect of benching operations will be eliminated and metal grinding time will be reduced to 50% or less. The effort will draw upon experience gained within the Government as well as in private industry. The first year's effort of pre-engineering associated with various manufacturing applications will determine the areas of potential robot use and the type(s) of equipment necessary. Specifications will be drawn up accordingly. Detailed in-house and out-of-house studies will be performed to aid in application and equipment selection. Subsequently, material acquisition and installation will be implemented. Material acquisition and installation will follow the first year's pre-engineering associated with various manufacturing applications and equipment selection.

Items Supported: The following items are examples of the types of items supported:

<u>Item</u>	<u>Weapons system</u>
Cannon, 105 mm Howitzer: M2A1-M2A2	Howitzer, Lt Towed, 105 mm: M101, M101A1
Cannon, 105 mm Howitzer: M137 M137A1	Howitzer, Lt Towed, 105 mm: M102
Canon, 105 mm Gun: M68	Tank, Combat F.T., 105 mm: M60, M60A1
Cannon, 90 mm Gun: M41	Tank, Combat F.T., 90 mm: M48, M48A3
Cannon, 105 mm Howitzer: M205	Howitzer, Lt Towed, 105 mm: M204
Cannon, 152 mm Gun Launcher: M81E1	ARAAV: M551
Cannon, 155 mm Howitzer: M185	Howitzer, Med S.P., 155 mm: M109A1

<u>Item</u>	<u>Weapons system</u>
Cannon, 155 mm Howitzer: M1, M1A1	Howitzer, Med Towed, 155 mm: M114, M114A1
Cannon, 155 mm Howitzer: M199	Howitzer Med Towed, 155 mm M198

Present Status

The end product will be an industrial robot capable of performing hazardous benching operations in a minimum amount of time. A second robot will be considered to perform the mundane, error prone task of bore inspection. In both cases, "movements" will be programmed and stored for immediate retrieval, implementing the use of the robots on the production lines. Trained operators will oversee the various operations. A final technical report will be written.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
81	287 (tentative)

8024 - MMT: High Speed Abrasive Belt Grinding (MPTS) (\$K 324)

This two-year funding effort will be used to introduce a new machining technology to the Arsenal. Abrasive belt sanding has, over many years, been used to polish cylindrical pieces in lathe setups or in hand applied machines; belts were used to polish various shapes and forms. Recent advancements in belt grits and bonds have improved belts, and machines have been designed so that abrasive belt use has developed from polishing into an abrasive metal removal process. FY 80 funding will be used to procure the equipment required to apply this technology to canon components.

Items Supported

<u>Item</u>	<u>Weapons system</u>
Cannon, 105 mm, Gun: M68	Tank, Combat, F.T., 105 mm Gun: M60 and M60A1
Cannon, 155 mm, Howitzer: M185	Howitzer, Med S.P., 155 mm M109A1
Cannon, 8 in. Howitzer: M201	Howitzer, Heavy S.P., 8 in.: M110A1

Present Status

The end product of this program will be a new machine with a capacity to drive a wide abrasive belt for metal removal on gun tube hoop zones. A final report will be written.

8026 - MMT: Application of Synthetic Quenchants to Gun Tubes and Heavy Weapon Components (MPTS) (\$K 143)

Quenching mediums for large alloy steel components consist primarily of water and oil. Often these quenchants are not satisfactory from either the thermal phenomena or the safety standpoint. As a result, problems such as incomplete transformation, cracking, distortion, residual stress, occasional fires, and noxious fumes frequently occur. Current manufacturing technology has not significantly alleviated this problem.

Recently, polymeric materials have become available that are water soluble and favorably influence the heat transfer properties of the quenching medium. These additions alter the quench power of the bath and allow the heat treater to obtain a range of cooling rates while eliminating the hazards associated with oil quenching.

Items Supported

<u>Item</u>	<u>Weapons system</u>
Cannon, 105 mm Gun: M68	Tank, F.T., 105 mm Gun: M60
Cannon, 155 mm Gun: M1A1	Howitzer, Med Towed, 155 mm: M114A1
Mortar, 4.2 in.: M30	Mortar, 4.2 in.: M30

Present Status: The end product of this project will be a comprehensive technique to quench components, generally requiring oil, in water based synthetic quenchants. Prototype parts will be available for testing and service.

8047 - MMT: Pass Through Steady Rests for Tube Turning (MPTS) (\$K 269)

Machining of cannon tubes exerts a transverse force greater than the full length tube can withstand. Dimensional and surface finish requirements are impossible to obtain when the tube is unsupported at its longitudinal center. A roller steady rest currently provides the required support, but it also becomes an

obstacle to turning the full length of the tube in one setup. Currently, in order to turn gun tubes, either the lathe must have two carriages or two separate lathes must be provided and the tube moved from machine to machine. There is no supplier of this type of equipment.

A pass through rest is needed which will allow the carriage to move from one supported area of the tube to the other without disturbing the setup. The design will be applicable to currently available equipment, but will have even greater impact on new equipment acquisitions.

In FY 80, a complete investigation of tube turning problems will be reviewed to determine anticipated loads and pressures that will be encountered in tube support. Depending on the outcome of this investigation, an in-house design or a specification for a rest attachment will be prepared.

Items Supported

<u>Item</u>	<u>Weapons system</u>
Cannon, 155 mm, Howitzer: M199	Howitzer, Med Towed, 105 mm: M198
Cannon, 105 mm, Gun: M68	Tank, Combat F.T., 105 mm Gun: M60 and M60A1
Cannon, 155 mm Howitzer: M185	Howitzer, Med S.P., 155 mm: M109A1
Cannon, 175mm Gun: M113	Gun, Field Artillery, S.P., 175 mm: M107
Cannon, 8 in. Howitzer: M201	Howitzer, Heavy S.P., 8 in.: M110A1

Present Status

The end product of this project will be the design and fabrication of a universal design of a pass-through rest. This unit will be adaptable to a wide variety of in-place equipment and will be specified so that it can be included in new equipment acquisitions. The equipment obtained as a result of this project will be installed on a production machine.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
78	
	80

8105 - MMT: Establish Rough Thread Blanks, 8 in. M201 Bushing
(MPTS) (\$K 88)

Single point slotting tools are currently being used to produce the configuration of the 8 in. M201 bushing step thread blanks. The steps are produced on an inside diameter and are somewhat inaccessible. The cubic volume of metal to be removed is high and the configuration is intricate so we require a new process that will remove the material at an accelerated rate. The mating component also has the same configuration but, because the threads are on the outside diameter, they are more accessible. Again, the metal volume to be removed is high. A machining process is needed to reduce machining time for both of these components.

There are a number of possible solutions to this problem. Some are applicable to both components, while others are limited to one or the other component. On first glance, multiple slotting tools, an extension of the present method, would increase productivity. Alternate solutions include EDM traveling wire, ECM blanking, and a combination of milling and multiple slotting.

Items supported:

<u>Item</u>	<u>Weapons system</u>
Cannon, 8 in. Howitzer: M201	Howitzer, Heavy S.P., 8 in.: M110A1
Cannon, 175 mm Gun: M113	Gun, Field Artillery, S.P., 175 mm: M107

Present Status

The end products of this project will be a special purpose machine dedicated to preparation of step thread blanks, a selection of the most advantageous approaches to the problem and execution of that selection in the form of equipment acquisition.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
81	307 (tentative)

8106 - MMT: Large Caliber Powder Chamber Boring (MPTS) (\$K 59)

Powder chamber contours are currently bored with a single point tool attached to one end of a bar, while the other end is

supported by the machine carriage. Chamber depths are often 3 feet. Tool pressure deflects the bar, reducing the accuracy of the boring operation and making it necessary to semifinish grinding the contour.

Application of a balance tool system will eliminate the deflection problem, thereby improving the accuracy of the bored hole, making the rough grinding operation unnecessary. An added benefit is that two tools will penetrate the workpiece faster and reduce boring operation time.

The thrust of this project will be the development of an hydraulically powered cutting tool system. The system will be unique in that, in current contour boring systems, the contour is developed by cross movement of the machine carriage while, in the system to be developed, the bar must be centered and the tools moved equally, but independently, from the bar to produce the contour. Since this is a major deviation from known systems, a reasonable amount of development work will be required.

Items Supported

<u>Item</u>	<u>Weapons system</u>
Cannon, 155 mm Howitzer: M185	Howitzer, Med, S.P., 155 mm: M109A1
Cannon, 155 mm Howitzer: M199	Howitzer, Med, Towed, 155 mm: M198
Cannon, 8 in. Howitzer: M201	Howitzer, Heavy, S.P., 8 in.: M110A1

Present Status

This is the first year of a three-year program. The end product of the FY 80 effort will be a systems design of a hydraulically controlled boring technique adaptable to current powder chamber boring equipment.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
81	159 (tentative)
8107 - MMT: Creep Feed Crush Form Grinding (MPTS) (\$K 348)	

Despite recent adaption of NC machining centers, the cost of producing certain intricate straight forms on components remains a

bottleneck operation. The availability of these machining centers is limited and most are working at near maximum capacity. Conventional grinding operations have a different limitation in their metal removal capacity when applied to intricate configuration development.

An FY 79 program successfully demonstrated the adaptability of creep feed grinding and a machine specification will be prepared. Equipment acquisition is now necessary. Two areas of application have been verified as candidates for creep feed crush form grinding: the bracket slot on the 105 mm M68 breechblock and the rack teeth on the 152 mm M162 coupling. In FY 79, a specification for a creep grinder was also prepared. To aid in the prove-out, the tooling package will also be specified.

The work to be performed with FY 80 funding will be to buy the equipment specified. The funding will also support installation and initial testing of the equipment.

Items Supported

<u>Item</u>	<u>Weapons system</u>
Cannon, 105 mm Gun: M68	Tank, Combat, F.T., 105 mm Gun M60
Cannon, 152 mm Gun: M162	Tank, Combat, F.T., 152 mm Gun M60A2

Present Status

The end product of the FY 80 project will be a creep feed crush form grinding machine tooled for the production of at least one component.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
79	82
81	73 (tentative)

8208 - MMT: Material Handling (MPTS) (\$K 113)

The movement of large gun tubes 12 in. in diameter, 20 feet long, weighing 2 to 4 tons, through the shops as well as positioning the pieces in machines for metal removal presents a materials handling problem. Presently, gun tubes are handled primarily

through large rail-mounted overhead cranes. The cranes provide longitudinal in-bay movement, but not cross-bay movement, and require costly and time consuming manpower to rope and position pieces in the machines and on the floor.

Positioning equipment (such as Heppenstall tongs), will be evaluated and side-mounted fork lights, monorail cross-bay transfers with floor controls, and other material moving equipment will be checked for application to the unique problems and material mix (breech rings, breech blocks, and small as well as large components) peculiar to large tubes.

Items Supported

<u>Item</u>	<u>Weapons system</u>
Cannon, 105 mm, Howitzer: M2A1-M2A2	Howitzer, Lt Towed, 105 mm: M101, M101A1
Cannon, 105 mm Howitzer: M137, M137A1	Howitzer, Lt Towed, 105 mm: M101
Cannon, 105 mm Gun: M68	Tank, Combat, F.T., 105 mm: M60
Cannon, 90 mm Gun: M41	Tank, Combat, F.T., 90 mm: M58, M48A3
Cannon, 105 mm Howitzer: XM205	Howitzer, Lt Towed, 105 mm: XM205
Cannon, 152 mm Gun Launcher: M81E1	ARAAV: M551
Cannon, 155 mm Howitzer: M185	Howitzer, Med S.P., 155 mm: M109A1
Cannon, 155 mm Howitzer: M1, M1A1	Howitzer, Med Towed, 15 mm: M109A1
Cannon, 155 mm Howitzer: M199	Howitzer, Med Towed, 155 mm: M198
Cannon, 81 Mortar: M29A1	Mortar, Infantry, 81 mm: M29A1 W/E (Cannon: M29A1 / Mount: M23A1/Baseplate: M3
Cannon, 4.2 in. Mortar: M30	Mortar, 4.2 in.: M30, W/E (Cannon: M30/Mount: M24 or M24A1)
Rifle, Recoil, 90 mm: M67	Rifle, 90 mm: M67, W/E
Rifle, Recoil, 106mm: M40A2, M40A4	Cannon, 106 mm Rifle, Recoil: M206
Rifle, Recoil, 106mm: M40A3, M40A5	Cannon, 106 mm Rifle, Recoil: M206A1

Present Status

Recommendations will be made for the purchase of specific types of equipment for specific manufacturing areas and a technical report will be written.

8341 - MMT: Hollow Cylinder Cutoff Machine (MPTS) (\$K 69)

Establishing the length of an item is accomplished in one of two ways: It is either parted off in a lathe and faced to length or it is rough sawed and set up in a lathe for facing to finish length dimension. In either case, the operation requires double measuring, double handling, and slow operating procedures. A new approach is required that will establish exact length, produce an acceptable finish, and eliminate redundant operations.

A new technology is being developed whereby a set of rotating cutters mills the cylinder to exact length, leaving a surface finish within that specified for cannon requirements. Currently available machines will not accommodate the forgings, but the technology is applicable.

The objective of this program is to develop a machine that will adjust tube position to establish overall component length and apply modern cutoff techniques to improve production efficiency.

Items Supported

<u>Item</u>	<u>Weapons system</u>
Cannon, 105 mm Howitzer: M2A2	Howitzer, Light Towed, 105 mm: M101 and M101A1
Cannon, 105 mm Gun: M68	Tank, Combat, F.T., 105 mm Gun: M60A1
Cannon, 155 mm Howitzer: M185	Howitzer, Med S.P., 155 mm: M109A1
Cannon, 155 mm Howitzer: M199	Howitzer, Med Towed, 155 mm: M198

Present Status

The end product of this project will be a tube cut-off machine that will combine a length control capability with an efficient cutoff technique to replace sawing procedures.

Funding

<u>Fiscal year</u>	<u>Funding (\$K)</u>
81	164 (tentative)

8342 - MMT: Keyway Milling Machine (MPTS) (\$K 242)

The 155 mm M185 gun tube requires 3 keyways be milled on centerline to close location and tolerances. Currently, these keyways are milled in three different machines requiring three material moves, three machine sites and three setups. Material handling, floor space, and operational time are all critical commodities in production areas.

A special purpose keyway milling machine will be developed to hold the tube on location while all three keyways are milled simultaneously. This would assure accuracy of all keyways to the proper centerline location and eliminate moving the tube from machine to machine, reduce operational time, and save floor space. Floor space savings would accrue from the reduction of required machines and from a reduction in tube storage while tubes are awaiting various operations.

This is a one-year funded effort. A single purpose milling machine, composed mainly of building block modules, will be designed and constructed. The machine will be equipped to automatically locate the cylindrical gun tube to the correct centerline position and to the non-symmetrical features of thread location. Approximately 50% of the funding will be used for material acquisition, and the remaining 50% will be used to support in-house fabrication and assembly.

Items Supported

<u>Item</u>	<u>Weapons system</u>
Cannon, 155 mm Howitzer: M185	Howitzer, Med S.P., 155 mm

Present Status

The end product of this project will be a special purpose milling machine. The design will consider automatic self-alignment of keyway positions so that, while the machine will be designed basically for the 155 mm tube: M185, it will also have the capability of producing keyways on centerline location on any size tube within the confines of the base design.

8057 - MMT: Dual Rifling Broach Removal System (MPTS) (\$K 215)

Removing the broaches automatically and concurrently after complete penetration through the bore will reduce operational time, the operator's contact time with the cutter, and fatigue, thereby reducing the safety hazard.

A rifling machine that produces two gun tubes simultaneously will be equipped with an automatic broach removal device. While broach removal systems are not entirely new, the systems currently available infringe on the space used by the second tube in the dual rifling system. The work effort then is to design and construct a removal system that will be compatible with the dual rifler. FY 80 funding will be used to design the equipment necessary to interface with existing production equipment and to build, install, and test the equipment.

Items Supported

<u>Item</u>	<u>Weapons system</u>
Cannon, 105 mm Gun: M68	Tank, Combat F.T., 105 mm M60 and M60A1

Present Status

The end product will be a production-worthy dual broach removal system that will also serve as a model for REARM specifications which identify dual rifling as a future machine requirement. A final report describing the operation and maintenance of the system will be prepared.

8059 - MMT: Salvage of Cannon Components by Electrodeposition (MPTS) (\$K 152)

Some components and full gun tubes have been rejected and condemned due to excess stock removal or mismachining. Many of these items could be restored to an acceptable condition if a metal deposition system could be designed to salvage these components.

A process which deposits additional metal to specific areas to compensate for excess stock removal would resolve the problem. The system would use plating solutions such as nickel or iron or, possibly, chromium. The deposition would be accomplished by immersing of the component in the plating solution by use of a selective or brush plating system or, for internal areas, a pump through system.

The proposed investigation will involve evaluating the component, the area of excess stock removal, and the function of the component. The selection of the method of metal deposition will follow with importance placed on the adaptability by operations personnel.

Items Supported

<u>Item</u>	<u>Weapons system</u>
Cannon, 105 mm Gun: M68	Tank, Combat, F.T., 105 mm Gun: M48A4, M48A5, and M48A6
Cannon, 105 mm Howitzer: M137/M137A1	Howitzer, Lt Towed, 105 mm: M102
Cannon, 105 mm Howitzer: M2A2	Tank, Combat, F.T., 152 mm Gun: M60A2
Cannon, 152 mm Gun Launcher: M162	Howitzer, Med Towed, 155 mm: M114A1
Cannon, 155 mm Howitzer: M1A1	Howitzer, Med S.P., 155 mm: M109A1, M109A1B
Cannon, 155 mm Howitzer: M185	Howitzer, Med Towed, 155 mm: M198
Cannon, 155 mm Howitzer: M199	Gun, F.A. S.P., 175 mm: M107
Cannon, 175 mm Gun: M113	Howitzer, Heavy S.P., 8 in.: M110
Cannon, 8 in. Howitzer: M2A2	Howitzer, Heavy S.P., 8 in.: M110A1
Cannon, 8 in. Howitzer: M201	

Present Status

End products from project:

1. Test Data and Systems Design
2. Prototype Processing Equipment
3. Plans for Implementing the Equipment into the Production Line
4. Operating Instructions
5. Final Report

The end product will be a metal deposition system capable of restoring components to an acceptable condition.

8060 - MMT: Improved Manufacturing Processes Related to Final Inspection of Cannon Tubes (MPTS) (\$K 268)

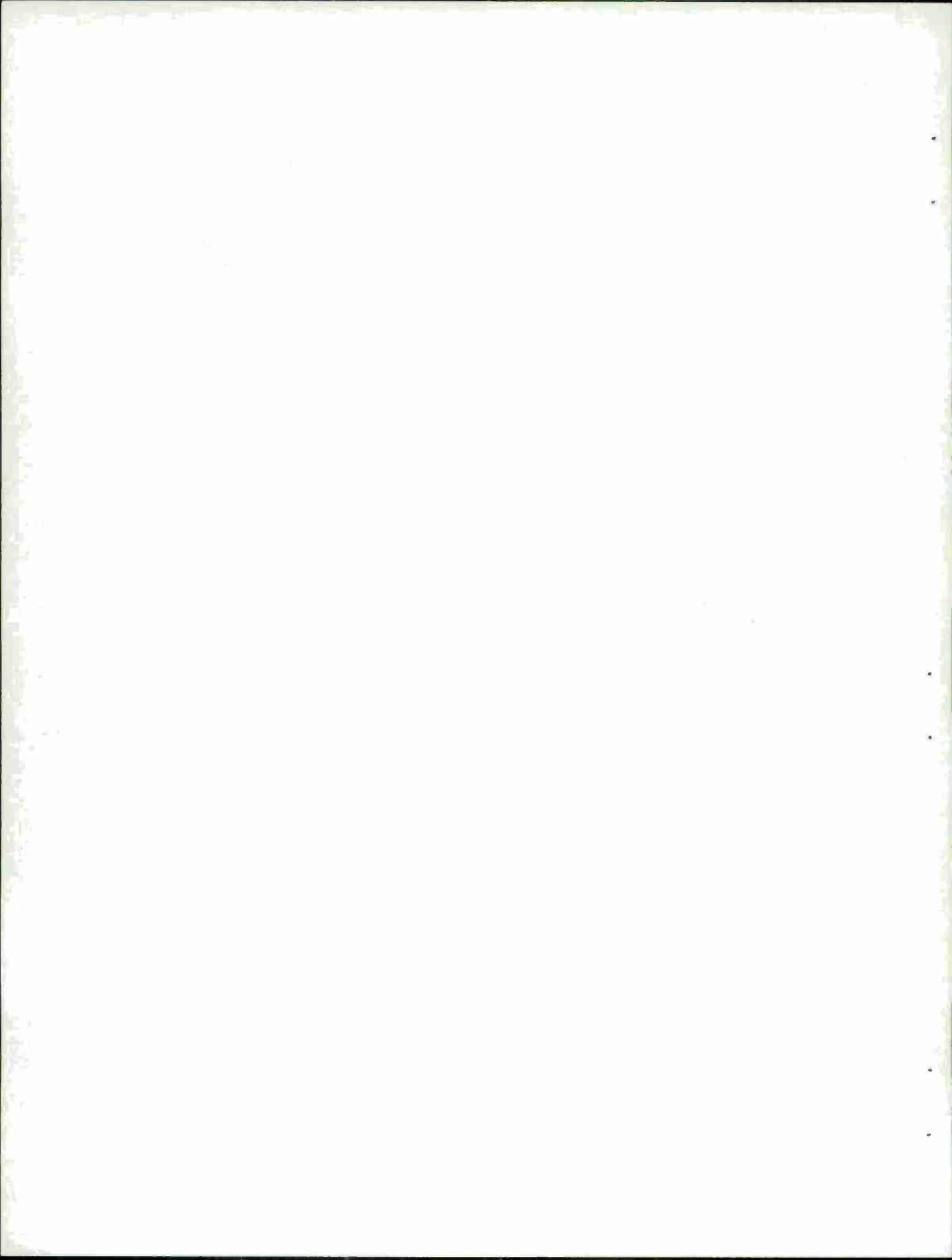
An in-depth analysis will be undertaken to incorporate the latest materials handling technology to fully mechanize the final inspection line. In addition, new technology will be employed to improve the cleaning and magnetizing processes. Procurement action will be undertaken to acquire the equipment. This equipment will be installed, fixtured and tested. Production data will be gathered and evaluated. Improvements in the inspection process will be made.

Items Supported

<u>Item</u>	<u>Weapons system</u>
Cannon, 155 mm Howitzer: M185	Howitzer, Med S.P., 155 mm: M109A1
Cannon, 105 mm Gun: M68	Tank, Combat F.T.: M60A1
Cannon, 120 mm Gun	Tank, Combat: XM1

Present Status

The end product will consist of new mechanized manufacturing equipment for magnetizing gun tubes, a new cleaning unit and a fully engineered system for loading and unloading gun tubes through the various inspection operations.



APPENDIX A
FORMAT FOR SEMI-ANNUAL REPORT

FORMAT FOR
SEMI-ANNUAL REPORTING

MANUFACTURING TECHNOLOGY (MANTECH) PROGRAM
PROJECT STATUS REPORT (RCS DRCMT-301)

USA ARMAMENT RESEARCH & DEVELOPMENT COMMAND
DOVER, NJ 07801

(If final report, so state here) Report Date:

1. Project Number. Insert the DARCOM seven digit project number. Also include in parentheses the four digit budget code from AR 37-100. (For multi year funded projects, list budget codes as shown in the example.)
2. Project Title. Enter the title of the project exactly as stated on the approved P-16 format.
3. Period Covered. Insert the dates of the period covered by the report. (See body of report for dates.)
4. Location of Work. List the name and address of the Government installation and contractor facility where the work is being accomplished.
5. Project Officer. Insert the name and telephone number (AUTOVON) of the individual responsible for technical supervision of the project.
6. Funding Status. a. Insert the total funds authorized and the date funds were made available to the action command.

b. Insert a cost breakout in the format below.

(1) In-House Effort	FYXX <u>Obligation</u>	FYXX <u>Expenditure</u>
Labor		
Materials		
(2) Other Government Agencies (OGA)	Date of	
(3) Contractor	Contract No.	Award Contract Value Expenditure
(4) GOCO		

(List by contractor for each contract let. Include contract number. If a contract is still to be let, enter "Contract to be let," estimate the contract value, and leave the remaining two columns blank.)

7. Milestone Chart. Include the Exhibit P-16 milestone chart that delineates the time phases and the major events of the project. This chart will be updated as necessary with each status report. Current position on the milestone chart will be noted. Slippage will be measured in terms of the original chart. Enter the fiscal year of funding for each milestone.

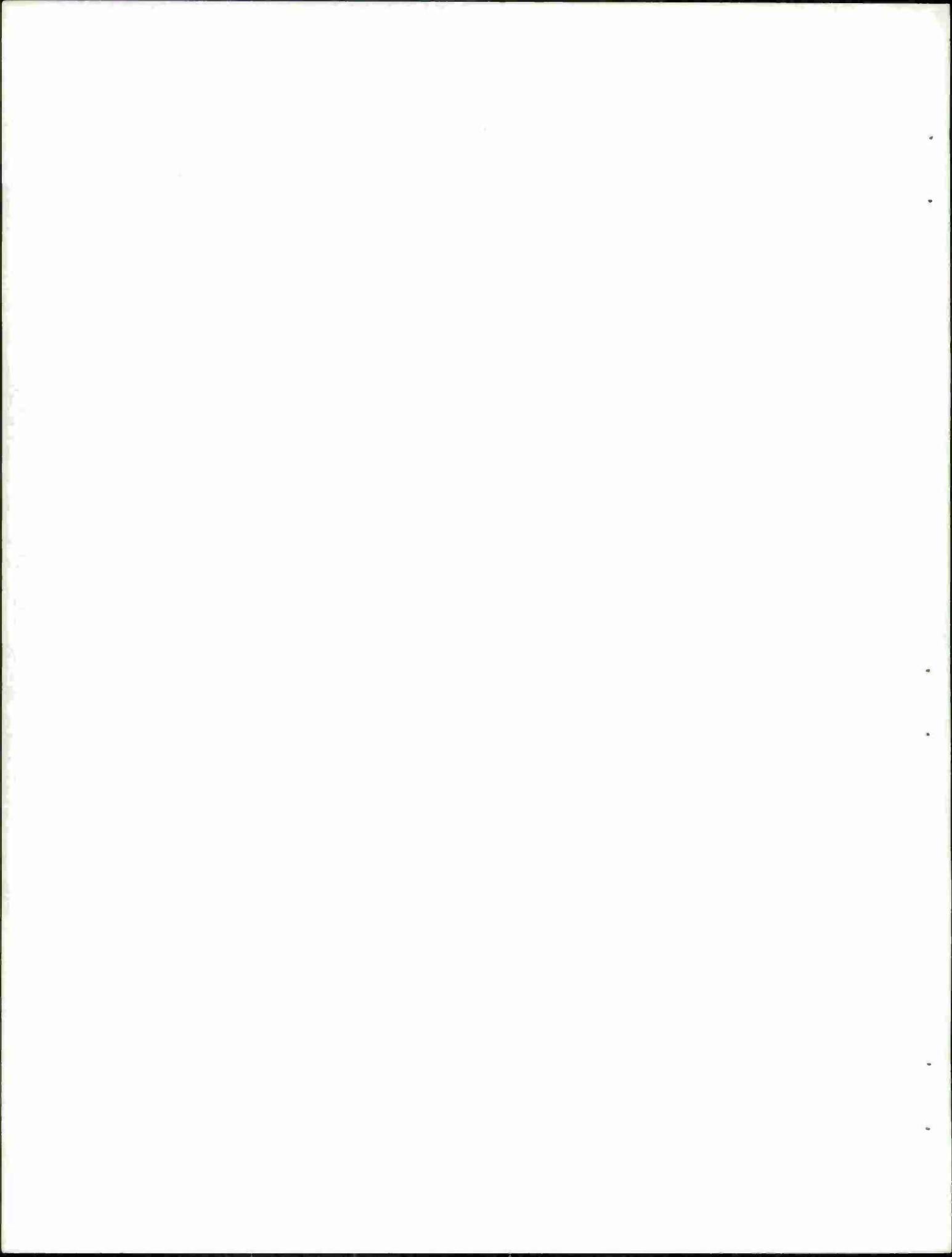
8. Item(s) Supported. (Use only applicable subparagraphs)

- a. Major End Items: List all families of items that will benefit from successful completion of the project.
- b. Components Supported: List individual components of the mission item that this effort directly supports.
- c. Facilities Supported: For MMT in support of modernization of facilities give the name of the facility and the technical area(s) supported. Identify facilities as GOGO, GOCO, COCO.
- d. Technical Area(s) Supported: For MMT projects, list the particular manufacturing processes, techniques, or methods that this project is addressing.

- e. Requirement Supported: Identify for MACI projects only, the requirement being addressed using the CARDS reference number and a brief summary sentence of the approved requirement.
9. Task. Identify the task. State why a solution is necessary.
10. Project Objective. Identify the major and minor objectives of the effort (not end products).
11. Work Accomplished. Insert a brief technical discussion of the work accomplished during the reporting period or, if this is a final report, a summary of the technical work accomplished. Highlight the technical achievements of this effort; include principal features, capabilities, and specifications. Include photographs and illustrations suitable for reproduction. Group by fiscal year of funding.
12. Benefits. This item needs to be completed only in the final status report. ie; in the event of a multi year funded project, fill this item in only for the last fiscal year to be completed.
- a. Discuss the benefits derived from this project and explain their value to the Army.
 - b. Identify all areas for application of project results.
 - c. Include proven cost reductions.
 - d. Indicate whether or not patent rights are involved.
13. Implementation Procedures. This item needs to be completed only in the final status report. Provide a detailed description of the action that will be, or has been, taken by the organization to implement the results of this project. ie - same as above

14. Remarks. This space is for entering all other information deemed pertinent by the project engineer. Describe any problems encountered in this section. Include any milestone slippages with reasons for slippage and length of slippage.

ARRADCOM Project Officer



APPENDIX B

FORMAT CHARTS FOR SEMI-ANNUAL BRIEFING

CHART 1 – KEY PROJECT INFORMATION

DATE:

CODE:

CATEGORY: FUNCTIONAL–
TECHNOLOGY–

MMT PROJECT:

PROJECT TITLE:

INITIATION DATE:

COMPLETION DATE:

PROJECT OFFICER:

PROJECT ENGINEER:

DESCRIPTION:

BENEFITS:

IMPLEMENTATION:

FACILITY PROJECTS SUPPORTED:

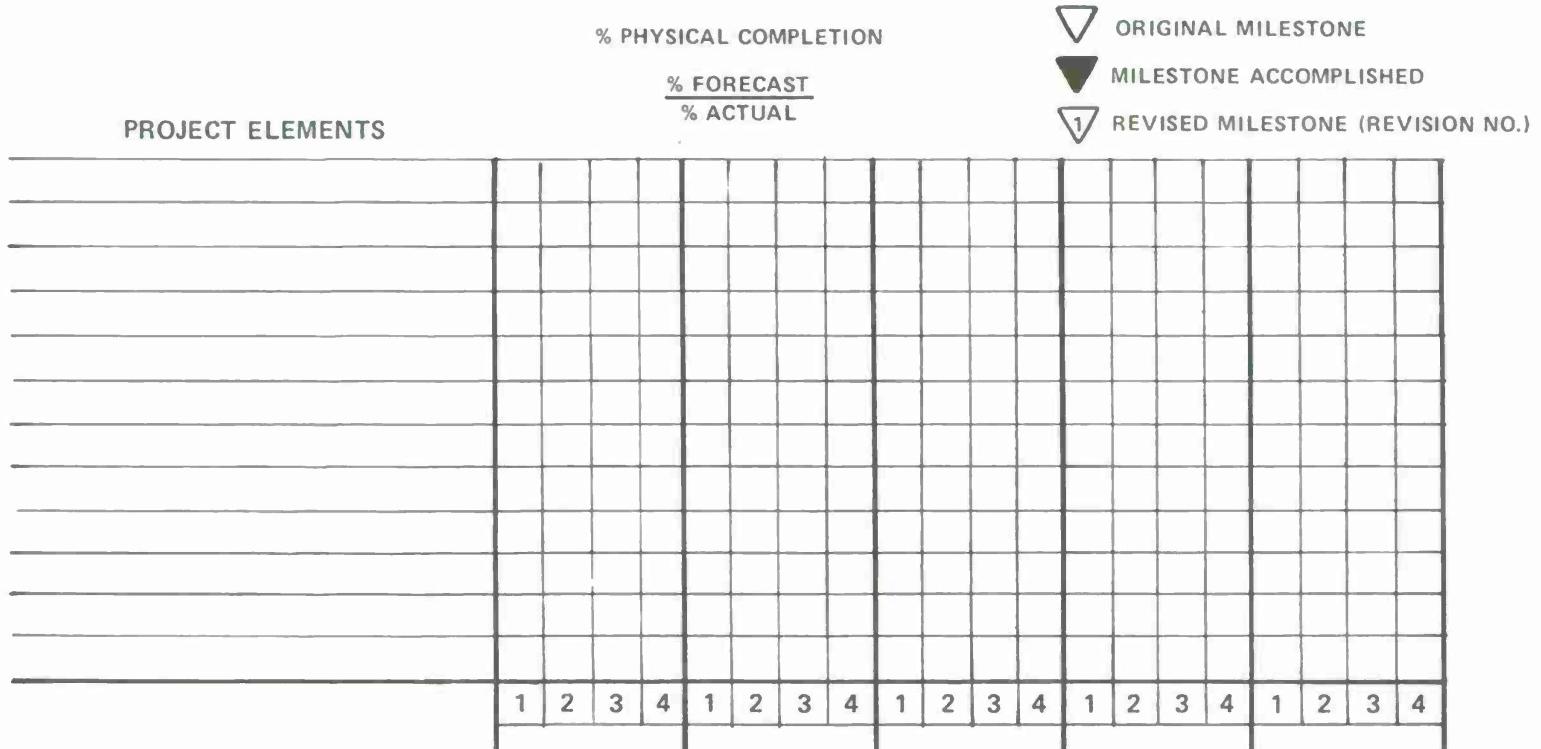
MAJOR ITEMS SUPPORTED:

CODE:

MILESTONE SCHEDULES
MMT PROJECT:

DATE:

PROJECT TITLE:



EXPENDITURES:

FORECAST
ACTUAL

LOCATION CODE: ()
I = IN-HOUSE
C = CONTRACTOR
A = GOGO
G = GOCHO

UNITS:
\$ THOUSANDS

FY

PROG

EXPEND

BAL

IN-HOUSE EFFORT
MAN YEARS

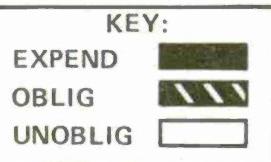
CHART 2

CODE:

FINANCIAL STATUS
MMT PROJECT:

DATE:

PROJECT TITLE:



TOTAL
PROGRAM
FY

UNITS: \$ MILLIONS

FY

FY

FY

FY

FY

96

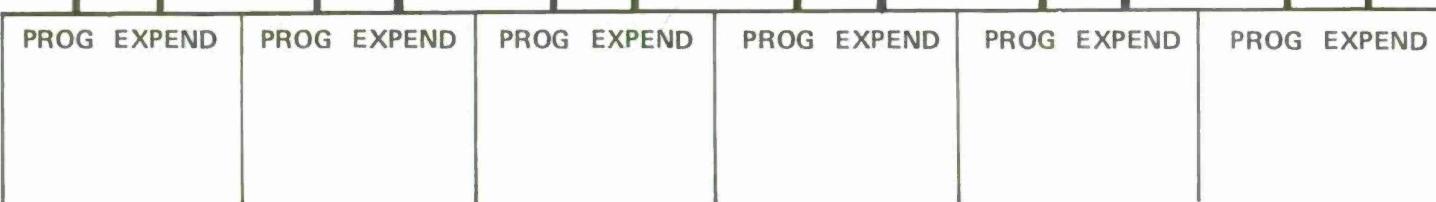


CHART 3

PROJECT SUMMARY

MMT PROJECT:

CODE:

DATE:

PROJECT TITLE: _____

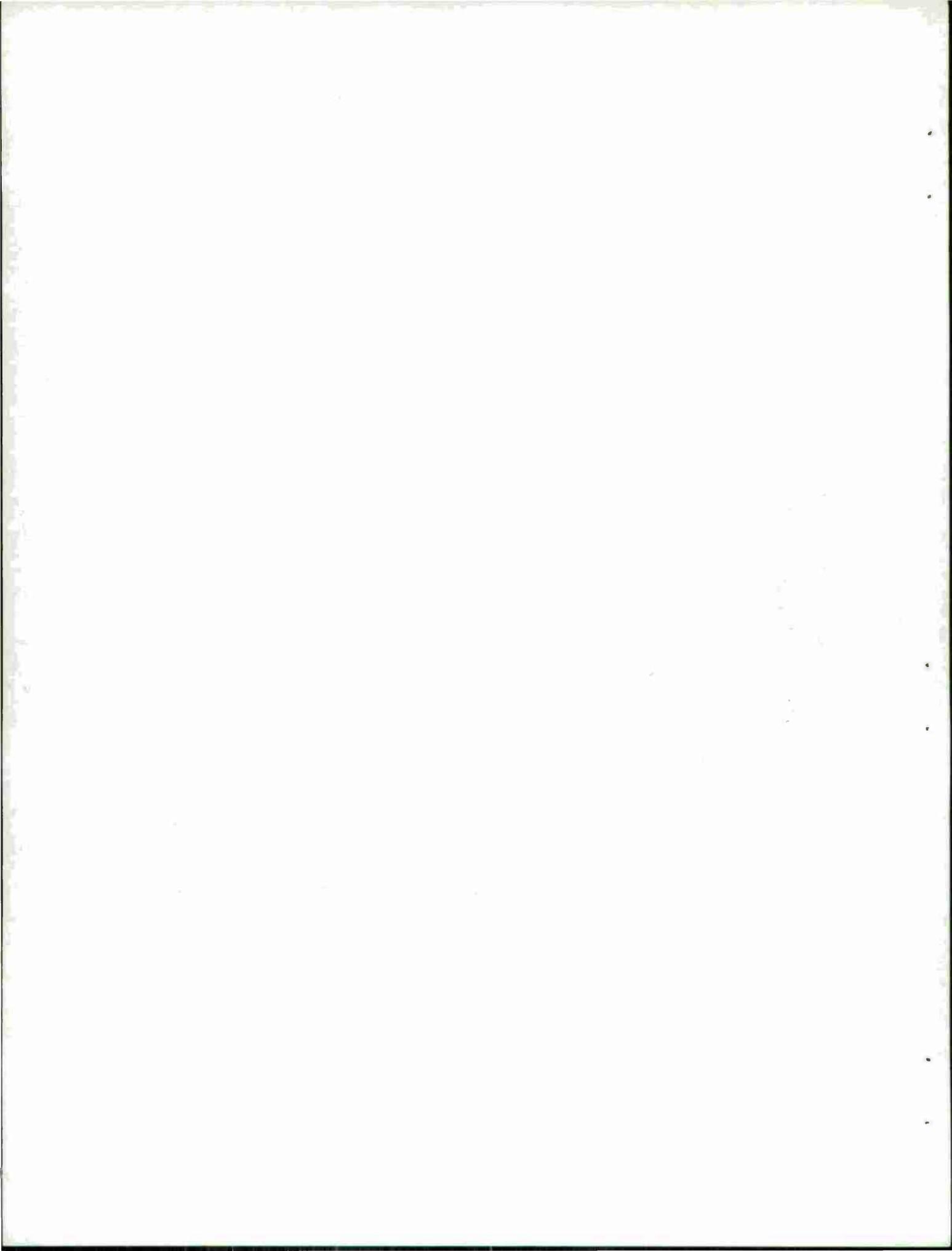
ACCOMPLISHMENTS:

PROBLEM AREAS:

RECOMMENDATIONS/ACTIONS:

ACTION RESPONSIBILITY:

CHART 4



APPENDIX C

COMPUTER PROGRAM

LCWSL MMT								
PN	PROJECT TITLE	ENGINEER	FY75	IN MILLIONS OF DOLLARS				
			EXT	DIV	START	IN H	GOCO	CONT
1264	ADV TECH FOR SUPPRESSIVE SHIELDING OF HAZARDOUS PRODS UP TO JR MARSICO VETE		3906	ESPD	19 AUG 75	0.000	0.000	0.000
TOTAL =	.6	TECH AREA IS SAFETY						
4000	AUTOMATED DM55 DETONATOR PRODUCTION EQUIPMENT	P MONTELEONE	5389	ESPD	NOV 72	.100	0.000	0.000
TOTAL =	.100	TECH AREA IS LAP						
4009	AUT CHATATION OF EQUIP FOR A/P OF SMALL SHAPE CHG ROCKETS	D HUBBARD	5669	ESPD	23 AUG 73	.260	.006	.384
TOTAL =	.650	TECH AREA IS LAP						
4012	ESTAB OF PROTOTYPE OF CONT FINAL ROLL MILL + PAD MAKEUP MACH	E PHUSELTON	4243	ESPD	AUG 72	.093	.597	0.000
TOTAL =	.699	TECH AREA IS PROP+EXP						
4013	CONTINUOUS NITROCELLULOSE BY MAGNESIUM NITRATE PROCESS	C LEWIS	3637	ESPD	AUG 71	.110	.003	0.000
TOTAL =	.113	TECH AREA IS PROP+EXP						
4015	ESTAB OF PROTO SYST FOR CONT PROC OF BENITE	E PHUSELTON	3014	ESPD	AUG 71	.082	.108	0.000
TOTAL =	.190	TECH AREA IS PROP+EXP						
4032	AUTOMATED EQUIPMENT (M739 FUZE)	P DEBART	5468	NFD	JAN 75	0.000	0.000	.758
TOTAL =	.750	TECH AREA IS FUZE						
4041	AUTOMATED EQUIPMENT FOR MOTAR COMPONENTS	O ANDERSON	6279	ESPD	21 SEPT 71	.228	0.000	.199
TOTAL =	.427	TECH AREA IS LAP						
4050	AUTOMATED LOADING OF PROPELLANT FLASH REDUCERS	D S DAVIS	3122	ESPD	SEPT 73	.219	.135	.713
TOTAL =	1.07	TECH AREA IS LAP						
4073	PHOTOFLASH COMPS DESENSITIZED BY COATANTS	B HERBEL	3961	ESPD	SEPT 73	.150	0.000	0.000
TOTAL =	.150	TECH AREA IS SAFETY						
4105	AUTO IN CLR CG + ASSY OF P PROP CHGS W/CENT CORE INGN	C J CARNALI	4162	ESPD	SEPT 72	.071	.025	.429
TOTAL =	.525	TECH AREA IS LAP						
4114	POLUTION ABATEMENT METHODS FOR P+E	I FORSTEN	2138	ESPD	27 DEC 68	.612	.178	.271
TOTAL =	.365	TECH AREA IS POLLUTION						
4165	PROTOTYPE FAC FOR RECOVERY OF HMX FROM RX/HMX AD MIXTURES	H RICCI	2160	ESPD	19 AUG 70	.015	0.003	.450
TOTAL =	.465	TECH AREA IS PROP+EXP						
4201	SAFETY ENGR IN SUPPORT OF AMMO PLANTS	J R MARSICO VETE	3906	ESPD	FY 71	.213	.149	.353
TOTAL =	1.00	TECH AREA IS SAFETY						
4202	PROTO. QUIPCUNTA TO PROD OF SOLVENT TYPE MULTIBASED N PROP	L PLEMPICKI	3637	ESPD	DEC 70	.070	.272	0.000
TOTAL =	.342	TECH AREA IS PROP+EXP						
4243	INVESTIGATION OF LOADING AMATEX 20	P SKERCHOCK	4252	ESPD	FY 74	2.230	.487	.161
TOTAL =	3.27	TECH AREA IS PROP+EXP						
4249	SEPOFFINE EXPLO F PENTACID + DR WATER SLURRIES	S DOLLMAN	3717	ESPD	SEPT 73	.025	0.000	0.000
TOTAL =	.250E-01	TECH AREA IS PROP+EXP						
4252	IMPROVE PRESENT PROC FOR MFG OF RX/HMX	S DOLLMAN	3717	ESPD	SEPT 73	.014	.171	.331
TOTAL =	.516	TECH AREA IS PROP+EXP						
4263	AUT CP IL CT LINE F/CONT COOL + PROCHL OG PROJ	C J ANDERSON	3162	ESPD	19 NOV 73	.765	0.000	.570
TOTAL =	1.31	TECH AREA IS LAP						
4267	CONT PROCESS FOR GRANULAR COMPS	L S OTSKY	2160	ESPD	OCT 74	.040	.043	0.000

TOTAL = .800E-01 TECH AREA IS PROP+EXP
 4271 IMPROVOCFOR POLISHING & GLAZING OF BLACKPOWDER BDSTRAUSS 3014 ESPD 9OCT74 .019 .140 0.000 0.000
 -TOTAL = .159 TECH AREA IS PROP+EXP SDOLLMAN 3717 ESPD JUN75 .063 .003 .351 0.000
 4277 NEWDAON FRC FOR HMX/MFG
 -TOTAL = .417 TECH AREA IS PROP+EXP JMSHOTINSKY 3998 ESPD 22SEPT75 0.000 0.000 .191 0.000
 4281 MET-HGS FOR CONSERVATION OF ENERGY AT ARMY AMMOPLANTS
 -TOTAL = .191 TECH AREA IS ENERGY HRICCI 2160 ESPD FEB75 .170 .285 0.000 .010
 4310 OMS RECRYSTALLIZATION OF HMX/RDX
 -TOTAL = .465 TECH AREA IS PROP+EXP JW BURLINGAME 2596 M+MTD SEPT73 .165 .002 0.000 .055
 6211 SINTERED STEEL PREFORM FOR WORKING OF FRAGTYPE SHELLBODIES
 -TOTAL = .222 TECH AREA IS MPTS KIYER 3679 MSO OCT74 .085 0.000 0.000 0.000
 6329 AUTODUT FOR SOUNDNESS OF MTL FOR FKES+FUGENART PROJS
 -TOTAL = .850E-01 TECH AREA IS MPTS DJ REAP 4389 MSO FY74 .054 0.000 .346 0.000
 6472 APPLOF ALT PROC FOR A B OF PRECISION PINIONS USED IN MFT FUZES
 -TOTAL = .406 TECH AREA IS FUZE TMCKIMM 3265 NFD FY74 .225 0.000 .069 .021
 6558 (CAM RELATED) ADAPTATION OF AUTO FUZE REGULATION
 -TOTAL = .315 TECH AREA IS FUZE GSALLADE 2522 MSO NOV73 .150 0.000 0.000 0.000
 6562 FEASIBILITY OF FUSING GNT CAST STEEL FOR AMMOMETAL PTSMFG
 -TOTAL = .150 TECH AREA IS MPTS VCOLANGELO 5517 BHL SEPT74 .139 0.000 .111 0.000
 7550 DEV OF PROTOPRODESR FACILITIES
 TOTAL = .250 TECH AREA IS MPTS

*****TOTALS MILLIONS OF DOLLARS*****

IN HOUSE =	6.307
GOCO =	2.501
CONTRACTS =	5.699
OTHER AGENCY =	.781
TOTAL =	15.288

DIVISION						
ESPD	MSO	ASD	NUC+FUZE	BHL	M+MTD	
5.489	.249	0.000	.225	.139	.165	IN-HOUSE
2.499	0.000	0.000	0.000	0.000	.002	CONTRACTS
5.173	.346	0.000	.069	.111	6.090	GOCO
.705	0.000	0.000	.021	0.000	.055	OGA
13.666	.635	0.000	.315	.250	.222	TOTAL

IN-HOUSE		CONTRACTS		OGA		TOTAL	
						TECH-AREAS	
1.583	.166	2.295	.025	4.069	LAP		
.539	.002	.114	.055	.702	MPTS		
.612	.076	.271	.004	.965	POLLUTION		
.363	.149	.353	.285	1.150	SAFETY		
2.931	2.106	1.313	.391	6.741	PROP/EXP		
.279	.0009	1.165	.021	1.465	FUZE		
.000	0.000	.191	.000	.191	ENERGY		
4.000	0.000	0.000	0.000	0.000	OTHER		

LCWSL MMT									
FN	PROJECT TITLE	ENGINEER	FY76 IN MILLIONS OF DOLLARS						
			EXT	DIV	START	IN H	GOCO	CONT	OGA
1264	ADVTECHFOR SUPPRESSIVE SHIELDING OF HAZARDOUS PRODSUP POP - JR MARSIGOVETE		3906	ESPD	19AUG75	.638	0.000	.169	.643
TOTAL =	1.45 TECH AREA IS SAFETY								
4000	AUTOMATED DM55 DETONATOR PRODUCTION EQUIPMENT	PHONTELONE	5389	ESPD	NOV72	.409	.001	.590	0.000
TOTAL =	1.00 TECH AREA IS LAP								
4009	AUTOFEQIPFOR A/P OF SMALL SHAPE CHARGER ROCKETS	DHUBBARD	5609	ESPD	23AUG73	.261	.030	.489	0.000
TOTAL =	.700 TECH AREA IS LAP								
4013	CONTNITROCELLULOSE BY MAGNESIUM NITRATE PROCESS	CWLEWIS	3637	ESPD	AUG71	.008	0.000	0.000	0.000
TOTAL =	.800E-02 TECH AREA IS PROP+EXP								
4032	AUTOMATED EQUIPMENT 4M739 FUZE	PDEBARI	5468	NFO	JAN75	.153	0.000	.462	0.000
TOTAL =	.615 TECH AREA IS FUZE								
4041	AUTOMATED EQUIPMENT FOR MORTAR AR COMPONENTS	OANDERSON	6279	ESPD	21SEPT71	.221	.010	.192	0.000
TOTAL =	.423 TECH AREA IS LAP								
4073	PHOTOFLASH COMPOSITIONS DESENSITIZED BY COATANTS	BWERBEL	3961	ESPD	OCT75	.260	0.000	0.000	0.000
TOTAL =	.200 TECH AREA IS SAFETY								
4105	AUTOINCRDG ASSY OF PROPGHGS/CENTCOREIGN	CJCARNALI	4162	ESPD	SEPT72	.147	.020	.518	0.000
TOTAL =	.605 TECH AREA IS LAP								
4114	POLUTIONABATEMENT METHODS FOR E	IFORSTEN	2138	ESPD	27DEC68	2.151	1.422	.403	.354
TOTAL =	4.33 TECH AREA IS POLLUTION								
4165	PROTOTYPE FACILITY FOR RECOVERY OF HMX/FRRDX/HMXADMX	HRICCI	2160	ESPD	19AUG70	0.000	0.000	.475	0.000
TOTAL =	.475 TECH AREA IS PROP+EXP								
4202	PROTO QUIFF OR CONT AUTO PROGFS SOLVENT TYPE MULTIBASE CHP - LPLEMPICKI	3637	ESPD	DEC70	.040	.100	0.000	0.000	
TOTAL =	.146 TECH AREA IS PROP+EXP								
4211	MOD OF PROCESS CONTROL OF EXPLOSIVE COMPOSITIONS	MHALIK	4123	ESPD	SEPT75	.173	.002	0.000	0.000
TOTAL =	.175 TECH AREA IS PROP+EXP								
4228	AUTOBAG LDG GM GASSY + PACKOUT (155MM+8)	JSHARZ	2758	ESPD	21AUG71	1.178	.025	.057	0.000
TOTAL =	1.26 TECH AREA IS LAP								
4237	CONTINUOUS NT PROCESS ENGINEERING	RHOLFF	4122	ESPD	SEPT72	.286	.042	.620	0.000
TOTAL =	.950 TECH AREA IS PROP+EXP								
4246	INVESTIGATION OF LOADING AMATEX 20	PSKERCHOCK	4252	ESPD	FY74	.637	0.000	.112	0.000
TOTAL =	.749 TECH AREA IS PROP+EXP								
4263	AUTCPilotLINE F/CONT COOL + PROCHLDG PROJ	CJANDERSON	3162	ESPD	19NOV73	.337	0.000	.693	.115
TOTAL =	1.15 TECH AREA IS LAP								
4271	IMPVD PROCFOR POLISH DRY + GLAZING OF BLACK POWDER	BOSTRAUSS	3014	ESPD	9OCT74	.116	.132	0.000	0.000
TOTAL =	.248 TECH AREA IS PROP+EXP								
4280	M577 FUZE AUTO PROCESS CONTROL PROTOTYPE EQUIP	JLUBA	2644	NFO	SEPT75	.042	0.000	.166	0.000
TOTAL =	.208 TECH AREA IS FUZE								
4281	METHODS FOR CONSERVATION OF ENERGY AT ARMY AMMO PLANTS	JMSHOTINSKY	3998	ESPD	22SEPT75	.413	.174	.247	.041
TOTAL =	.675 TECH AREA IS ENERGY								
4284	PROGRAM FLUIDIC CONTROL SYSTEM FOR LAP MACHINERY	SJBERNHARDT	6507	ESPD	OCT75	.168	0.000	.052	0.000

TOTAL = .160 TECH AREA IS LAP
 4285 TNEQUIVALENCYTESTINSUPPORTOFSAFETYEHGRFORAMMOPLAN JR MARSICO VETE 3906 ESPD 17SEPT75 .140 .001 .130 .055

 TOTAL = .326 TECH AREA IS SAFETY
 4288 EXPLOSIVESAFESEPARATION+SENSITIVITYCRITERIA JR MARSICO VETE 3906 ESPD 27JAN77 .164 .020 .167 .229

 TOTAL = .580 TECH AREA IS SAFETY
 4289 HAZARDCLASSIFICATIONSUDIESOFPREPELLANTS+EXPLOSIVE JR MARSICO VETE 3906 ESPD 11SEPT75 .054 .071 .125 0.000

 TOTAL = .250 TECH AREA IS SAFETY
 4310 DMSORECRYSTALLIZATIONOFHMX/RDX HRICCI 2160 ESPD FE 875 .088 .310 0.000 .002

 TOTAL = .400 TECH AREA IS PROP+EXP
 4311 DEVINITIALAUTOPRODEQUIPFORALOFXM692MINEDISPSYSTEM LWEINER 6506 ESPD 20NOV75 .185 .050 .995 0.000

 TOTAL = 1.23 TECH AREA IS LAP
 4337 CURING/MOLDINGPROCESSFORADAM BFSELITTO 4536 MSD AUG76 .436 0.000 .061 .007

 TOTAL = .504 TECH AREA IS MPTS
 4338 PROJFORCEOFAUTOPROC+PROTODEQUIPFORLAOFM483155MMPR WFIELD 4422 MSD 19MAY76 .104 .017 .638 0.000

 TOTAL = .759 TECH AREA IS LAP
 4456 COMPUTERIZEDMATERIALPROPERTYDATAINFOSYSTEM HEPEBLY 4222 ASD FY76 .030 0.000 .070 0.000

 TOTAL = .100E+00 TECH AREA IS OTHER
 6472 APPLOFALTPROLFORFABOFPRECISIONPINIONSUSEDINMTFUZES DJREAD 4389 MSD FY74 .054 0.000 .346 0.000

 TOTAL = .400 TECH AREA IS FUZE
 6625 ESTABOFAUTOSASSYAINSPECTLINEFORBEEHIVEFUZEMVMTS DJREAP 4389 MSD OCT75 .003 0.000 .218 .007

 TOTAL = .228 TECH AREA IS FUZE
 6628 AUTOINSPOFMTEUZECOMPONENTIS(MOVEMENTPLATES) IMOKIMM 3265 NFD OCT75 .046 0.000 .199 .005

 TOTAL = .250 TECH AREA IS FUZE
 6634 ARMORPENETRATORSFCRMINTANKGUN CESALLADE 2522 MSD NOV75 .097 0.000 0.000 .403

 TOTAL = .500 TECH AREA IS MPTS
 6640 PRODCONTRL+QAOFSHAPECHEGLINERSBYAUTOX-RAYANALYSIS FNITT 6345 M+HTD OCT75 .077 0.000 .056 0.000

 TOTAL = .133 TECH AREA IS MPTS
 6642 INERTIAHELDROTATINGBANDSFORPROJBODIES WSHARPE 3742 MSD JULY76 .197 0.000 .194 .056

 TOTAL = .447 TECH AREA IS MPTS
 6716 DEVOFMATHMODELOFFORMOPERSFORCUR/FUTARIMPTSDESIGNS FLEE 3679 MSD APR76 .145 0.000 .150 0.000

 TOTAL = .295 TECH AREA IS MPTS
 6736 TECHRLADINESSACCELTHRCOMPUTERINTEGMFG(TRACE) SSHART 3721 MSD OCT76 .028 0.000 .012 0.000

 TOTAL = .400E-01 TECH AREA IS MPTS
 6759 INVECSFFEAOFUTILAUTOTRANS-HOTFORMPRESSESFORMORTAR RJSTOCK 3790 MSD 1NOV77 .015 .117 0.000 0.000

 TOTAL = .132 TECH AREA IS MPTS
 7203 APPLPRODGUNCOMPOFLEASTCOSTTOLAFINISHESRELATED JR ODD 5946 BWL 26AUG7 .052 0.000 0.000 0.000

 TOTAL = .520E-01 TECH AREA IS MPTS
 7236 APPLOFRAPIDHEATERRATTGANNONTUBES PATHORTON 5243 BWL OCT75 .152 0.000 .026 0.000

 TOTAL = .178 TECH AREA IS MPTS
 7241 IMPVMNTOFHONINGEQUIPAPROCEDURES CHROSE 5611 BWL 26AUG7 .107 0.000 .055 0.000

 TOTAL = .162 TECH AREA IS MPTS
 7588 ROTARYFORGEINTEGRATEDPRODTECH LLIUZZI 5827 BWL AUG75 .360 0.000 .082 0.000

 TOTAL = .382 TECH AREA IS MPTS

*****TOTALS MILLIONS OF DOLLARS*****

IN-HOUSE =	9.994
GOCO =	2.544
CONTRACTS =	8.76
OTHER AGENCY =	1.917
TOTAL =	23.224

DIVISION

ESPO	MSD	ASD	NUC+FUZE	BWL	M+MTO	
7.956	1.079	.130	.241	.611	.077	IN HOUSE
2.416	.134	6.508	0.000	0.006	0.000	CONTRACTS
6.634	1.619	.170	.827	.163	.056	GOCO
1.439	.473	6.500	.605	0.000	0.000	OGA
17.839	3.305	.100	1.073	.774	.133	TOTAL

TECH AREAS

IN HOUSE	CONTRACTS	GOCO	OGA	TOTAL	
2.95	.153	.224	.115	7.442	LAP
2.006	.117	.036	.466	2.825	MPTS
2.151	1.422	.083	.354	4.330	POLLUTION
1.190	.092	.591	.927	2.806	SAFETY
1.356	.566	1.207	.602	3.145	FROP+EXP
.296	0.000	1.391	.012	1.701	FUZE
.413	.174	.247	.041	.675	ENERGY
.63	0.003	.070	0.000	.100	OTHER

LCWSL MMT

PN	PROJECT TITLE	ENGINEER	FY77 IN MILLIONS OF DOLLARS						
			EXT	DIV	START	IN H	GOCO	CONT	OGA
1264	ADVTECH FOR SUPPRESSIVE SHIELDING OF HAZARDOUS PROCESSES	JRMARSICOVETE	3906	ESPD	19AUG75	.030	0.000	0.000	.070
<u>TOTAL =</u>	<u>.106E+00 TECH AREA IS SAFETY</u>								
4000	AUTOMATED M55 DETONATOR PRODUCTION EQUIPMENT	PHONTELEONE	5389	ESPD	NOV72	.242	.008	0.000	0.000
<u>TOTAL =</u>	<u>.250 TECH AREA IS LAP</u>								
4105	AUTO INHRLDG ASSY OF PFRCHG/H/CENT COREIGN	CJCARNALI	4162	ESPD	SEPIZ2	.225	.040	0.000	0.000
<u>TOTAL =</u>	<u>.225 TECH AREA IS LAP</u>								
4114	POLLUTION ABATEMENT METHODS FOR P+E	IFORSTEN	2138	ESPD	27DEC68	.225	0.000	0.000	.025
<u>TOTAL =</u>	<u>.250 TECH AREA IS POLLUTION</u>								
4165	PROTO FAC FOR RECOVERY OF HMX/FDX/HMX AD MIXTURE	MRICCI	2160	ESPD	19AUG70	0.000	0.000	.400	0.000
<u>TOTAL =</u>	<u>.400 TECH AREA IS PROP+EXP</u>								
4202	PROTOLQUIFFOR CONTAUTO PROD SOLVENT TYPE MULTIBASEC PROP	LPLEMPICKI	3637	ESPD	DEC70	.063	.219	0.000	0.000
<u>TOTAL =</u>	<u>.282 TECH AREA IS PROP+EXP</u>								
4249	SER OFFINE EXPLRS PRENTACID & OR WATER SLURRIES	SOULLMAN	3717	ESPD	SEPIZ3	.070	.280	.030	0.000
<u>TOTAL =</u>	<u>.350 TECH AREA IS PROP+EXP</u>								
4252	IMPROVE PRES PROC FORM FG OF FRDX+HMX	SOULLMAN	3717	ESPD	SEPT73	.054	.315	.020	0.000
<u>TOTAL =</u>	<u>.389 TECH AREA IS PROP+EXP</u>								
4285	TEST EQUIV TESTS IN SUPPORT OF SAFETY ENG FOR AMMO PLANTS	JRMARSICOVETE	3906	ESPD	17SEPI75	.081	0.000	0.000	0.000
<u>TOTAL =</u>	<u>.810E+01 TECH AREA IS SAFETY</u>								
4286	EXPLOSIVES SAFE SEPARATION + SENSITIVITY CRITERIA	JRMARSICOVETE	3906	ESPD	27JAN77	.139	0.000	0.000	0.000
<u>TOTAL =</u>	<u>.139 TECH AREA IS SAFETY</u>								
4289	HAZARD CLASSIFICATIONS STUDIES OF PROR+EXPLOSIVES	JRMARSICOVETE	3906	ESPD	11SEPT75	.051	.014	0.000	0.000
<u>TOTAL =</u>	<u>.650E+01 TECH AREA IS SAFETY</u>								
4435	OPERATE PROTO SYSTEM 67 PROF CHGE	EDCRANE	5727	ESPD	SEPT76	.125	.375	0.000	0.000
<u>TOTAL =</u>	<u>.500 TECH AREA IS LAP</u>								
4444	BODY FORM 42/M4 GRENADE	WFIELD	4422	MSD	JAN78	.086	.003	.447	0.000
<u>TOTAL =</u>	<u>.536 TECH AREA IS MPS</u>								
4457	MULTITOOL DIAHALOADER (CLINNOG 37+AV)	PHONTELEONE	5389	ESPD	18AUG76	.025	.616	0.000	0.000
<u>TOTAL =</u>	<u>.641 TECH AREA IS LAP</u>								

***** TOTALS MILLIONS OF DOLLARS *****

IN HOUSE = 1.416

GOCO = 1.830

CONTRACTS = .867

OTHER AGENCY = .095

TOTAL = 4.208

DIVISION

ESPO	MSD	ASD	NUC+FUZE	BWL	M+MTD
1.336	.086	6.600	0.000	6.600	0.000 - IN-HOUSE
1.827	.003	0.003	0.000	0.000	0.000 CONTRACTS
.426	.447	0.000	0.000	0.000	0.000 - GOO
.095	0.000	0.000	0.000	0.000	0.000 OGA
3.672	.536	0.000	0.000	0.000	0.000 TOTAL

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TECH AREAS					
IN-HOUSE	CONTRACTS	GOO	OGA	TOTAL	
.617	.494	0.000	0.000	1.616	LAP
.086	.003	.447	0.000	.536	MPTS
.225	1.000	0.000	.025	.250	POLLUTION
.301	.614	0.000	.070	.385	SAFETY
.187	.814	.026	0.000	1.421	PROP+EXP
.600	0.000	0.000	0.000	0.000	FUZE
1.101	0.002	0.000	0.000	0.104	ENERGY
0.600	0.600	0.009	0.000	0.300	OTHER

-----LCHSL MMT-----								
PN	PROJECT TITLE	ENGINEER	FY77	IN MILLIONS OF DOLLARS				
			EXT	DIV	START	IN H	GOCO	CONT OGA
4060	AUTOMATED H65 DETONATOR PRODUCTION EQUIPMENT	P MONTELEONE	5389	ESPD	NOV72	.558	.417	.025 0.000
TOTAL =	1.06 TECH AREA IS LAP							
4105	AUTOINCRL DG+ASSY OF P ROPCHGSH/CENT COREIGN	C J CARNALI	4162	ESPD	SEPT72	.390	.139	.856 0.000
TOTAL =	1.39 TECH AREA IS LAP							
4114	POLUTION ABATEMENT METHODS FOR P+E	I FORSTEN	2138	ESFD	27DEC68	.756	.143	.001 .897
TOTAL =	.997 TECH AREA IS POLLUTION							
4202	PROTOEQUIP FOR CONTAINERS AUTOPROD SOLVENT TYPE MULTIBASEC PROP	L PLEMPICKI	3637	ESPD	OCT70	.161	.308	0.000 .016
TOTAL =	.505 TECH AREA IS PROP+EXP							
4211	MODERNIZATION OF ROD CNTL OF EXPLOSIVE COMPS	M HALIK	4123	ESPD	SEPT75	.197	.000	.230 0.000
TOTAL =	.427 TECH AREA IS PROP+EXP							
4223	APPL ULTRASONIC ENERGY TO DOUBLE BASE PROPEX TR PROCESSES	E PHUSELTON	3014	ESPD	AUG72	.262	.013	.035 0.000
TOTAL =	.338 TECH AREA IS PROP+EXP							
4228	AUTOBAG LDG CHG ASSY+PACKOUT (155M4+8)	J SHARZ	2758	ESPD	21AUG71	.253	.147	0.000 0.000
TOTAL =	.400 TECH AREA IS LAP							
4237	CONTINUOUS TNT PROCESS ENGINEERING	R WOLFF	4122	ESPD	SEPT72	.257	.000	.008 0.000
TOTAL =	.265 TECH AREA IS PROP+EXP							
4252	IMPROVE PRES PROC FORM FG OF RDX+HMX	S DOLLMAN	3717	ESPD	SEPT73	.206	.414	.264 0.000
TOTAL =	.884 TECH AREA IS PROP+EXP							
4263	AUTOPILOT LINE F/CONT COOL+PROCEHDG PROJ	C J ANDERSON	3162	ESPD	19NOV73	.725	0.000	.150 .025
TOTAL =	.300 TECH AREA IS LAP							
4267	CONT PROCESS FOR GRANULAR COMPS	L SOTSKY	2168	ESPD	OCT74	.071	.429	0.000 0.000
TOTAL =	.500 TECH AREA IS PROP+EXP							
4280	M577 FUZE AUTO PROC+CONTROL PROTOEQUIP	J LUBA	2644	NFO	SEPT75	.155	0.000	.745 0.000
TOTAL =	.900 TECH AREA IS FUZE							
4281	METHODS FOR CONSERVATION OF ENERGY AT ARMY AMMO PLANTS	J M SHOTINSKY	3998	ESPD	22SEPT75	.354	.318	.263 .065
TOTAL =	1.00 TECH AREA IS ENERGY							
4285	TNT EQUIV TEST IN SUPPORT OF SAFETY ENGR FOR AMMO PLANTS	J R MARSICO VETE	3906	ESPD	17SEPT	.189	.002	.088 .101
TOTAL =	.380 TECH AREA IS SAFETY							
4288	EXPLOSIVES SAFE SEPARATION+SENSITIVITY CRITERIA	J R MARSICO VETE	3906	ESPD	27JAN77	.145	0.000	.385 .370
TOTAL =	.600 TECH AREA IS SAFETY							
4289	HAZARD CLASSIFICATION STUDIES OF PROP+EXPLOSIVES	J R MARSICO VETE	3906	ESPD	11SEPT75	.118	0.000	.182 .006
TOTAL =	.306 TECH AREA IS SAFETY							
4291	BLAST EFFECTS IN MUNITION PLANT ENVIRONMENT	J R MARSICO VETE	3906	ESPD	17OCT75	.069	0.000	.176 .105
TOTAL =	.350 TECH AREA IS SAFETY							
4313	DMSC RECRYSTALLIZATION OF HMX/RDX	H RICCI	2160	ESPD	FE875	0.000	0.000	.200 0.000
TOTAL =	.200 TECH AREA IS PROP+EXP							
4311	DEV INITIAL AUTO PROOF FOR LAP XM692 MINE DISPSYST	L WEINER	6506	ESPD	20NOV75	.261	.157	1.035 0.000
TOTAL =	1.45 TECH AREA IS LAP							
4341	IMPROVED NITROCELLULOSE PURIFICATION PROCESS	BOSTRAUSS	3014	ESPD	APR77	.070	.095	0.000 0.000

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TOTAL = .165 TECH AREA IS PROP+EXP 4343 IMPROVENITROCELLULOSEPROCESSCONTROL	JWLEACH	3836 ESPD	MAY77	.165	.117	0.000	0.000
TOTAL = .382 TECH AREA IS PROP+EXP 4362 CONTAUTOPOSTCYCLICCONCFACFORLCOMPLOADEDPROJS	CJANDERSON	3162 ESPD	11MAY77	.339	.023	.032	0.000
TOTAL = .406 TECH AREA IS LAP 4410 MFGTUNGSTENPENETRATORSBYTAERSHAGING	RHULBERT	5291 M+MTD	28MAR77	.025	0.000	.247	.125
TOTAL = .397 TECH AREA IS MPTS 4416 DEVAPHOEOUTOFTMFGPROCFORSA(GEMSS)	ILMCKECHNIE	5459 MSO	APR77	.002	0.000	.115	0.000
TOTAL = .126 TECH AREA IS LAP 4481 AUTOEQUIPFORMORTARIGNITIONGTS	VJGRASSO	4545 ESPD	15JAN77	.258	.607	.647	0.000
TOTAL = .912 TECH AREA IS LAP 4462 MODERNIZEDADFORMULTIBASEPROF	LPLEMPICKI	3637 ESPD	JUL77	.030	.133	0.000	0.000
TOTAL = .163 TECH AREA IS PROP+EXP 4481 PYROLYSISOFARMYAMMPLANTOLIDWASTE	RSCOLA	3360 ESPD	18AUG77	.089	.001	.010	0.000
TOTAL = .100E+00 TECH AREA IS ENERGY 4719 MCIEVALFOELECTRICALCOMPONENTDETECTORS	AJOHLSEN	2980 MSO	22FEB77	.100	0.000	0.000	0.000
TOTAL = .100 TECH AREA IS OTHER 6634 ARMORPENETRATORSFORPAINTANKGUN	CESALLADE	2522 MSO	NOV75	.092	0.000	.241	.374
TOTAL = .767 TECH AREA IS MPTS 6643 PRODCONTROL+QASHAPEDCHGELINERBYAUTOX-RAYANALYSIS	FWITT	6345 M+MTD	OCT75	.075	0.000	.061	.029
TOTAL = .165 TECH AREA IS MPTS 6676 EVALOFAQUAQUENCHUNDERPRODCONDITONS	DOGUSTAD	2522 MSO	JAN77	.024	.276	0.000	0.000
TOTAL = .300 TECH AREA IS MPTS 6663 PRODFTUNGSTENBASEHEAVYALLOYPENETRATORSFORAPMUNIT	RRHULBERT	6291 M+MTD	MAR77	.154	0.000	0.000	.346
TOTAL = .500 TECH AREA IS MPTS 6716 DEVOFATHMODELSCOFFORMOPERSFORUR/FUTANTMPTSDESIGNS-FLEE	FLEE	3679 MSO	APR76	.145	0.000	.150	0.000
TOTAL = .295 TECH AREA IS MPTS 6777 DEVOFPRODPROCFOR105MMX710E1	RPOHL	3121 MSO	MAY77	.350	0.000	.050	0.000
TOTAL = .406 TECH AREA IS MPTS 7213 HIGHSPEDCHROMIUMPLATINGTECHNIQUE	VPGRECO	5717 BHL	FEB77	.027	0.000	.100	0.000
TOTAL = .127 TECH AREA IS MPTS 7485 APPLOFCHEMICALPROTCIMPVSURFACEFINISH	TPOCHILY	5717 BHL	FEB77	.147	0.000	0.000	0.000
TOTAL = .147 TECH AREA IS MPTS 7586 ROTARYFORGEINTERATEOPRODTECH	FAHEISER	5507 BHL	OCT77	.155	0.000	.005	0.000
TOTAL = .166 TECH AREA IS MPTS 7722 ROTARYFORGINGOF8M201	RMEINHART	5703 BHL	7FEB77	.207	0.000	.041	0.000
TOTAL = .248 TECH AREA IS MPTS 7725 AUTFETTAGEARTYBARRELSPROBURYROTARYFORGING	LLIUZZI	5827 BHL	MAR77	.165	0.000	0.000	0.000
TOTAL = .165 TECH AREA IS MPTS 7726 APPRLROTARYFORGEINTGODPRODTECHBYCOLDFORGHARMFCRGPFSH	LLIUZZI	5827 BHL	MAR77	.415	0.000	.177	0.000
TOTAL = .592 TECH AREA IS MPTS 7727 RECYCLINGOFSCRAPGUNJUGESBYROTARYFORGING	CCALDERONE	4179 BHL	MAR77	.215	0.000	.009	0.000
TOTAL = .224 TECH AREA IS MPTS 7733 ELIMOFEXTTUBEMACHPRIORTOSHGEAUTOFRETTAGE	HGOODHEIM	5849 BHL	JAN77	.045	0.000	.002	0.000

TOTAL = .470E-01 TECH AREA IS MPTS

*****TOTALS MILLIONS OF DOLLARS*****

IN HOUSE =	8.481
GOCO =	3.145
CONTRACTS =	6.533
OTHER AGENCY =	1.359
TOTAL =	19.518

DIVISION

ESPO	MSD	ASD	NUC+FUZE	BWL	M+MTO	
5.983	.713	0.000	.155	1.376	.254	IN HOUSE
2.869	.276	0.000	0.000	0.000	0.000	CONTRACTS
4.587	.559	0.000	.745	.334	.388	GOCO
.485	.374	0.000	0.000	0.000	.500	OGA
13.524	1.922	0.000	.900	1.710	1.062	TOTAL

TECH. AREAS

IN HOUSE	CONTRACTS	GOCO	OGA	TOTAL	
2.786	.896	2.863	.025	6.570	LAP
2.241	.276	1.083	.874	4.474	MPTS
.756	.143	.001	.097	.937	POLLUTION
.521	.002	.331	.282	1.636	SAFETY
1.479	1.509	.737	.016	3.741	PROP+EXP
.155	0.000	.245	0.000	.245	FUZE
.443	.319	.273	.065	1.100	ENERGY
.100	0.000	0.000	0.000	.100	OTHER

LCWSL MHT								
		FY78 IN MILLIONS OF DOLLARS						
PN	PROJECT TITLE	ENGINEER	EXT	DIV	START	IN H	GOCO	CONT OGA
4800	AUTOMATEDM550DETONATORPRODUCTIONEQUIPMENT	P MONTELEONE	5389	ESPD	NOV72	.690	.134	.674
TOTAL =	1.48 TECH AREA IS LAP							
4041	AUTOEQUIPFORMMORTARCCMPS	O ANDERSON	4582	ESPO	21SEPT71	.152	.056	.552 0.000
TOTAL =	.760 TECH AREA IS LAP							
4140	REDUCEDWTFORGINGFOR 400000YXH650	C KOBIALKA	5361	MSD	27APR78	.002	0.000	.078 0.000
TOTAL =	.666E-01 TECH AREA IS MPTS							
4153	DEVFAIRAMETERSFORINERTIAHELDROTATINGBANDS	H SHARPE	2809	MSD	MAY78	.127	0.000	.223 0.000
TOTAL =	.350 TECH AREA IS MPTS							
4163	CONTROLLEDPROBLOGSYSTFOR105MMHEAT-TM456A1	P SKERCHOCK	4252	ESPD	30MAY78	.074	.125	0.000 0.000
TOTAL =	.199 TECH AREA IS LAP							
4214	POLLUTIONLNGRFOR1983-85 REQUIREMENTS	I FORSTEN	2138	ESPD	15DEC77	.664	.483	.033 0.000
TOTAL =	1.18 TECH AREA IS POLLUTION							
4226	AUTOBAGLDRGG+GEASSY+PACK(155MM+8)	J SHARZ	2758	ESPD	21AUG71	.404	0.003	.030 0.000
TOTAL =	.484 TECH AREA IS LAP							
4237	CONTNTNTPROCENGINEERING	R WOLFF	4122	ESPD	SEPT72	.121	0.000	.009 0.000
TOTAL =	.130 TECH AREA IS PROP+EXP							
4249	SEPOFFINEEXPLOSIVEFRACIDWATERSLURRIES	S DOLLMAN	3717	ESPD	SEPT73	.030	.220	0.000 0.000
TOTAL =	.250 TECH AREA IS PROP+EXP							
4252	IMPROVEPRESPROCFORMFGOFRDX+HMX	S DOLLMAN	3717	ESPD	SEPT73	.491	.057	0.000 0.000
TOTAL =	.548 TECH AREA IS PROP+EXP							
4263	AUTCPILOTLINEF/CONTCOCL+PROGOFHELDGPROJS	C JANDERSON	3162	ESPD	19NOV73	.201	0.000	.056 0.000
TOTAL =	.257 TECH AREA IS LAP							
4267	IMPPROVEOPROCFORGRANULARCOMP	L SOTSKY	2160	ESPO	OCT74	.047	.009	.288 0.000
TOTAL =	.344 TECH AREA IS PROP+EXP							
4281	METHODSFORCONSERVATIONATARMYAMMOPLANTS	J MSHOTINSKY	3998	ESPD	22SEPT75	.239	.681	.139 0.000
TOTAL =	1.06 TECH AREA IS ENERGY							
4285	TNEQUIVTESTFORSAFETYENGRFORAMMOPLANTS	J R MARSICOVETE	3906	ESPO	17SEPT75	.235	.044	0.000 .121
TOTAL =	.400 TECH AREA IS SAFETY							
4286	EXPLOSIVESAFESEPARATION+SENSITIVITYCRITERIA	J R MARSICOVETE	3906	ESPD	27JAN77	.459	.017	.134 .216
TOTAL =	.826 TECH AREA IS SAFETY							
4289	HAZARDCLASSIFICATIONOFPROM/EXPLOSIVES	J R MARSICOVETE	3906	ESPO	11SEP75	.093	.005	.111 .005
TOTAL =	.214 TECH AREA IS SAFETY							
4300	DHSRCRYSTALLIZATIONNCFMHX/RDX	H RICCI	2166	ESPO	FEB75	.026	.170	0.000 0.000
TOTAL =	.196 TECH AREA IS PROP+EXP							
4322	DSGNCRITERIA+SYSTCHARACTEROFELECTCONTLPRODFAC	L WDOOREMUS	3084	ASD	SEPT78	.098	.360	.007 0.000
TOTAL =	.185 TECH AREA IS MPTS							
4328	BULKPHOFSHIPPINGCONTR	N SEPELL	5358	MSD	10JUL78	.161	0.000	.040 0.000
TOTAL =	.201 TECH AREA IS OTHER							
4341	IMPROVEDNITROCELLULOSEPURIFICATIONPROG	B D STRAUSS	3014	ESPD	APR77	.090	.575	0.000 0.000

TOTAL = .665 TECH AREA IS PROP+EXP
 4443 IMPROVEDNITROCELLULOSEPROCCONTL JLEACH 3836 ESPD MAY77 .015 0.000 0.000 0.000
 TOTAL = .150E+01 TECH AREA IS LAP
 4431 AUTOEQUIPFORMMORTARIGNCTGS VJGRASSO 4545 ESPD 15JAN77 .061 .048 .549 0.000
 TOTAL = .658 TECH AREA IS LAP
 4444 BODYFORM42/M46GRENADE WFIELD 4422 MSD JAN78 .326 0.000 .300 0.000
 TOTAL = .626 TECH AREA IS MPTS
 4447 NITROGUANIDINEPROCCONTLANALYTICALSYSTS CWLEWIS 3637 ESPD 18JAN78 .346 .020 .024 0.000
 TOTAL = .390 TECH AREA IS PROP+EXP
 4449 PROCIMPROVEMENTFORCOMPC HRICCI 3760 ESPD 17JAN78 .137 .780 0.000 0.000
 TOTAL = .917 TECH AREA IS PROP+EXP
 4462 MODERNIZEDFADFORMULTIBASEPROP LPLEMPICKI 3637 ESPD JUL77 .090 .502 0.000 0.000
 TOTAL = .592 TECH AREA IS PROP+EXP
 4466 EVALOFTNICYCLOTOLOCOTOLWAARRADCONMELTPOURFAC CBPIPER 6144 ESPD JAN78 .169 .031 0.000 0.000
 TOTAL = .200 TECH AREA IS LAP
 4469 AUTCINSERTIONOFGRENADELAYERS RHAUSCHILD 4545 ESPD JAN78 .216 .011 .275 0.000
 TOTAL = .502 TECH AREA IS LAP
 4472 DEVOLFLQUIPFORAUTO/MECHFABOFCENTCOREPROPBAGS GCHEH 5727 ESPD DEC77 .067 .013 .135 3.000
 TOTAL = .215 TECH AREA IS LAP
 4498 DEVMETHODFORCONSOL+AUTOASSYOFMALLMINES SLOMBARDO 5459 MSD DEC77 .195 .130 0.000 0.000
 TOTAL = .325 TECH AREA IS LAP
 4528 PROCIMPROVEMENTOFPRESSRDXCOMPS SOULLMAN 3717 ESPD 22DEC77 .059 .241 0.000 0.000
 TOTAL = .300 TECH AREA IS PROP+EXP
 6634 MFGPROC/DUALLOYS-LGCALARMORDEFATPROJ CESALLADE 2522 MSD NOV75 .160 0.000 0.033 .240
 TOTAL = .400 TECH AREA IS MPTS
 6681 PROCPARAMETERFORPRODEFORMHOPROJS BOGUSTAD 2522 MSD JAN78 .403 0.000 .195 .002
 TOTAL = .646 TECH AREA IS MPTS
 6683 PRODFTUNGSTENBASEHEAVYALLOYFENETRATORSFORAFMUNIT RRHULBERT 6291 M+MTD MAR77 .197 0.000 0.000 .330
 TOTAL = .527 TECH AREA IS MPTS
 6725 AUTOINERTIABANDMACHFORAMMUNITION RSTANTON 5752 M+MTD JAN78 .075 0.000 .250 0.000
 TOTAL = .325 TECH AREA IS MPTS
 6736 TECHREADINESSACCELTHRU COMPUTER INTEGRATEDMFG(TRACT) SSHART 3721 MSD OCT76 .069 .022 .009 0.000
 TOTAL = .100E+00 TECH AREA IS MPTS
 7213 HIGHSEEDCHROMIUMPLATINGTECHNIQUE VGRECO 5717 BWL FEB77 .027 0.000 .100 0.000
 TOTAL = .127 TECH AREA IS MPTS
 7825 ELIMINATIONOFFACILITATINGHONINGOPERATIONS HGOODHEIM 5849 BWL JAN78 .133 0.003 0.000 0.000
 TOTAL = .133 TECH AREA IS MPTS

*****TOTALS MILLIONS OF DOLLARS*****

IN HOUSE =	7.149
GOCO =	4.454
CONTRACTS =	4.081
OTHER AGENCY =	.916

TOTAL = 16.600

DIVISION

ESPO	MSD	ASD	NUC+FUZE	BWL	M+MTO	
5.176	1.443	.598	0.000	.160	.272	IN HOUSE
4.222	.152	.080	0.000	0.000	0.050	CONTRACTS
2.679	.845	.307	0.000	.100	.250	GOCO
.344	.242	0.000	0.000	0.000	.330	OGA
12.621	2.682	.185	0.060	.250	.852	TOTAL

TECH AREAS

IN HOUSE	CONTRACTS	GOCO	OGA	TOTAL	
2.244	.548	2.141	.002	4.935	LAP
1.617	.192	1.162	.572	3.453	MPTS
.06-	.483	.133	0.000	1.180	POLLUTION
.787	.066	.245	.342	1.446	SAFETY
1.437	2.574	.321	0.000	4.332	PRCP+EXP
.06-	0.630	0.000	0.000	0.000	FUZE
.239	.681	.139	0.000	1.059	ENERGY
.161	0.696	.040	0.000	.201	OTHER

LCWSL MMT								
PN	PROJECT TITLE	ENGINEER	FY79	IN MILLIONS OF DOLLARS				
			EXT	OIV	START	IN H	GOCO	CONT
4000	AUTONEDDETONATORPRODUCTIONEQUIPMENT	P MONTELONE	5389	ESPD	NOV72	1.159	.351	.090
TOTAL =	1.60 TECH AREA IS LAP							
4007	EVALOFACETICACIDANHYDRORECYCLE	D FREEMAN	6349	ESPD	FY79	.062	.254	0.000
TOTAL =	.316 TECH AREA IS POLLUTION							
4024	DESIGN&DEV&BUILDPROTOAUTOASSY&MACHM223FUZE	J SHADE	4757	MSD	FY79	.111	0.000	1.021
TOTAL =	1.13 TECH AREA IS MPTS							
4046	OEVAUTOMETHTOPREFQUANANALOFLBLENDEOEXPLSP	P MONTELEONE	5389	ESPD	1 JUN 79	.237	.070	0.000
TOTAL =	.307 TECH AREA IS LAP							
4051	IMPVO INSTRUMENTATION&CONTFCACIOPANT	C MCINIOSH	4123	ESPD	FY79	.157	0.000	0.000
TOTAL =	.157 TECH AREA IS PROP&EXP							
4062	AUTOMFGSYSF/MORTAR INCRCONTAINERS	P BONNETT	3162	ESPD	DEC78	.126	.011	.370
TOTAL =	.507 TECH AREA IS LAP							
4064	AUTOLAPCPNSF/105MM TANKCARTRIDGES	KELISCHICK	4162	ESPD	DEC78	.181	.085	.996
TOTAL =	1.26 TECH AREA IS LAP							
4084	OPACITY/MASSEMISSIONSCORRELATIONS	J CLANCY	3404	MSD	DEC78	.017	.010	.094
TOTAL =	.121 TECH AREA IS POLLUTION							
4124	FABOFCONTACTUATIONSYSHOUSINGS	M WEBSTER	5749	MSD	DEC78	0.000	.790	0.000
TOTAL =	.790 TECH AREA IS MPTS							
4137	AUTOLOGOFCTR CORE IGNITERS	O DAVIS	2758	ESPD	DEC78	.079	.006	.120
TOTAL =	.205 TECH AREA IS LAP							
4163	CONTROLLEDPKDLDGSYSTFOR105MMHEAT-TM456A1	P SKERCHOCK	4252	ESPD	30 MAY 78	.387	0.000	.032
TOTAL =	.419 TECH AREA IS LAP							
4189	HIGHFRAGSTEELPRODPROCESS	M SHARPE	2809	MSD	FY79	.058	0.000	.242
TOTAL =	.400 TECH. AREA IS MPTS							
4194	IMPVO PROCPORPRESSLXL4EXPLCHGS	A PALLINGSTON	4464	MSD	FY79	.259	0.000	.068
TOTAL =	.327 TECH AREA IS PROP&EXP							
4214	POLLUTIONENGRF/1983-85 REQUIREMENTS	J CANAVAN	4284	ESPD	150EC77	.716	.533	.020
TOTAL =	1.27 TECH AREA IS POLLUTION							
4225	REDWATERPOLABATEMENTSYST	J CARRAZZA	3544	ESPD	FY79	.120	.230	0.000
TOTAL =	.350 TECH AREA IS POLLUTION					0.000	0.050	0.000
TOTAL =	0. TECH AREA IS POLLUTION							
4263	AUTOPilotLINEF/CONT COOLAR PROOFHELDGPROJS	C JANDERSON	3162	ESPD	19 NOV 73	.329	0.000	0.000
TOTAL =	.329 TECH AREA IS LAP							
4281	CONSERVATIONOFENERGYATARMYAMMOPLANTS	J SWOTINSKY	3998	ESPO	22 SEPT 75	.562	.713	.010
TOTAL =	1.29 TECH AREA IS ENERGY							
4285	INTEQUIVTESTF/SAFETYENGR	P PRICE	3022	ESPO	17 SEPT 75	.420	0.000	0.000
TOTAL =	.420 TECH AREA IS SAFETY							
4286	EXPLOSAFESEPARATION+SENSITIVITYCRITERIA	R RINDNER	3906	ESPO	27 JAN 77	.581	.037	.055

TOTAL = .643 TECH AREA IS SAFETY
 4291 BLASTEFFECTSINMUNITION&ENVIRONMENT PPRICE 3022 ESPD 17OCT75 .155 0.000 .088 0.000

TOTAL = .235 TECH AREA IS SAFETY
 4309 TANKAMMO120MM, PROCESSDEV LLEMPICKI 363 ESPD FY79 .384 .464 0.000 0.000

TOTAL = .848 TECH AREA IS PROPP+EXP
 4318 DMSOREGRYSTALLIZATIONOFHMIX/RDX LSIBERMAN 2160 ESPD FEB75 .389 .394 0.000 0.000

TOTAL = .403 TECH AREA IS PROPP+EXP
 4312 INJECTIONMOLDINGF/PENEXPLOLDG BPIPER 4252 ESPD DEC78 .166 0.000 .095 0.000

TOTAL = .261 TECH AREA IS LAP
 4335 TITANIUMGYROFORCOPPERHEAD BPERL-MUTTER 5749 MSD FY79 .081 0.000 .330 0.000

TOTAL = .411 TECH AREA IS MPTS
 4341 IMPNITROCPURIFPROC RBOWMAN 6226 ESPD FY77 .136 .606 0.000 0.000

TOTAL = .742 TECH AREA IS PROPP+EXP
 4352 IMPROVFORPOTTINGELECTRONICASSYFORGATOR SPOLANSKI 5569 MSD 1FE879 .005 0.600 .078 0.000

TOTAL = .830E-01 TECH AREA IS MPTS
 4444 BODYFORM42/M46GRENADE WFIELD 4422 MSD DEC78 .082 .231 .025 .225

TOTAL = .563 TECH AREA IS MPTS
 4459 OPTOFNITROQPARTICLESIZE CLEWIS 5572 ESPD FY79 .025 .225 0.000 0.000

TOTAL = .250 TECH AREA IS PROPP+EXP
 4460 CONTMIXER-ILLUMINATCOMPANAL+CONTSYS RWOLFE 4122 ESPD FY79 .086 .150 0.000 0.000

TOTAL = .236 TECH AREA IS PROPP+EXP
 4462 MODFAOF/MULTIBASEPROPELLANT LPLEMPICKI 3637 ESPD JUL77 .132 .396 0.000 0.000

TOTAL = .520 TECH AREA IS PROPP+EXP
 4466 EVALNTCYCLOTOLOCOLINMELT-POURFAC CBPIPER 6144 ESPD JAN78 .335 0.000 .126 0.000

TOTAL = .461 TECH AREA IS PROPP+EXP
 4469 AUTOINSERTIONOFGRENADELAYERS RHauschilD 4545 ESPD JAN78 .075 0.000 .325 0.000

TOTAL = .400 TECH AREA IS LAP
 4476 DEHUMIDSBPROP EBOZZA 3241 ESPD FY79 .075 .100 0.000 0.000

TOTAL = .175 TECH AREA IS ENERGY
 4498 DEVMEHTF/CONSOL+AUTOASSYOFMALLMINES SLOMBARDO 5348 MSD DEC77 .068 1.055 .024 0.000

TOTAL = 1.15 TECH AREA IS LAP
 4508 PROCIMPVHTOPRESSABLERDXCOMP SDOLLMAN 2160 ESPD 22DEC77 .068 .289 0.000 0.000

TOTAL = .357 TECH AREA IS PROPP+EXP
 6553 ACOUSTICINSPECTSYST DSEBASTIAN 3527 MSD FY73 .067 0.000 .028 0.000

TOTAL = .950E-01 TECH AREA IS MPTS
 6634 MFGPROCF/OU-LGCALARMORDEFATINGPROP CSALLADE 2522 MSD NOV75 .242 0.000 .308 0.000

TOTAL = .542 TECH AREA IS MPTS
 6682 SIMULATIONOFAMMOPONLINES HONEILL 3121 MSD DEC78 .170 0.000 0.000 0.000

TOTAL = .176 TECH AREA IS MPTS
 6683 PDNOFTUNGSTENBASEHEAVYALLOYPENETRATORF/APMUNITIONS RHULBERT 6291 MSD MAR77 .146 0.000 0.000 0.000

TOTAL = .146 TECH AREA IS MPTS
 6716 DEVOFCOMPUTERAIDEOMODOFFORMOPNSF/CUR/FUTMRTSDESIGN FLEE 3679 MSD APR76 .026 0.000 .289 0.000

TOTAL = .366 TECH AREA IS MPTS
 6736 TECHREADINESSACCELTHRU COMPUTERINTGRMFG(TRACIM) SSHART 3721 MSD OCT76 .081 0.000 .175 0.000

TOTAL = .256 TECH AREA IS MPTS
 6738 USE OF ULTRA HIGH SURFACE PSDS/MTL REMOVAL ARTY SHELL RPOHL 6240 MSD FY79 .132 0.000 .049 0.000
 TOTAL = .181 TECH AREA IS MPTS
 7213 HIGH SPEED CHROMIUM PLATING TECHNIQUE VGRECO 5717 BWL FEB77 .153 0.000 .051 0.000
 TOTAL = .204 TECH AREA IS MPTS
 7246 SIMPLIFICATION OF BREECH RING MEGA HANDLING JR000 5737 BWL 9MAR79 .058 0.000 .003 0.000
 TOTAL = .610E-01 TECH AREA IS MPTS
 7313 17 OPTIMIZATION OF STEP THEAD TOOLING PCASEY 5737 BWL 9MAR79 .061 0.000 .016 0.000
 TOTAL = .770E-01 TECH AREA IS MPTS
 7482 MODIFIED RIBBON RIFLING GENERATING MACHINE PCASEY 5737 BWL 9MAR79 .091 0.000 .048 0.000
 TOTAL = .139 TECH AREA IS MPTS
 7724 GROUP TECHNOLOGY OF WEAPONS HGOODHEIM 5849 BWL 9MAR79 .085 0.000 0.000 0.000
 TOTAL = .850E-01 TECH AREA IS MPTS
 7726 APP ROTARY FORGE INTEGRATED PROTECH BY COL DE FORGE WARM FORGFS HLLIUZZI 5827 BWL MAR77 .349 0.000 .124 0.000
 TOTAL = .473 TECH AREA IS MPTS
 7727 RECYCLING OF SCRAP GUN TUBES BY ROTARY FORGING CCALDERONE 5443 BWL MAR77 .221 0.000 .033 0.000
 TOTAL = .254 TECH AREA IS MPTS
 7730 MANUFACTURE OF SPLITTING BREECH SEALS JR000 5737 BWL 9MAR77 .118 0.000 .022 0.000
 TOTAL = .146 TECH AREA IS MPTS
 8025 ELEC PROFILE READ OUT GAGE FOR POWDER CATAMBER CONTROL PCASEY 5737 BWL 9MAR79 .069 0.000 .037 0.000
 TOTAL = .106 TECH AREA IS MPTS
 8107 CREER FEED CRUSH FOR GRINDING PCASEY 573 BWL 9MAR79 .066 0.000 .016 0.000
 TOTAL = .820E-01 TECH AREA IS MPTS

06

*****TOTALS MILLIONS OF DOLLARS*****

IN HOUSE =	9.958
GOCO =	6.670
CONTRACTS =	5.383
OTHER AGENCY =	.325
TOTAL =	22.336

DIVISION

ESPD	MSD	ASD	NUC+FUZE	BWL	M+HTD	
7.142	1.545	0.000	0.000	1.271	0.000	IN HOUSE
4.584	2.086	0.000	0.000	0.000	0.000	CONTRACTS
2.319	2.714	0.003	0.000	.350	0.000	GOCO
6.500	.325	0.000	0.000	0.000	0.000	OGA

14.045	6.670	0.000	0.000	1.621	0.000 TOTAL
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IN HOUSE	CONTRACTS	TECH AREAS			TOTAL
		60C0	06A	TOTAL	
2.807	4.570	2.452	0.000	6.437	LAP
2.472	1.021	2.878	0.325	6.696	MPTS
0.945	4.927	0.116	0.000	2.056	POLLUTION
1.156	0.007	0.135	0.000	1.298	SAFETY
1.974	2.224	0.194	0.000	4.369	PROP+EXP
0.000	0.000	0.000	0.000	0.000	FUZE
0.637	0.013	0.010	0.000	0.040	ENERGY
0.000	0.000	0.000	0.000	0.000	OTHER

LCWSL MMT

PN	PROJECT TITLE	ENGINEER	IN MILLIONS OF DOLLARS						
			FY80	EXT	DIV	START	IN H	GOCO	CONT
4000	AUTOMATEDM55DETTONATORPRODUCTIONEQUIP	RMONTEONE	5389	ESPD	FY71	.230	.020	0.000	0.000
TOTAL =	.250 TECH AREA IS LAP								
4033	CAUSTICRECOVERYFRSODIUMNITRATESLUDGE	HRICCI	2160	ESPD	FY80	.153	0.000	0.000	0.000
TOTAL =	.153 TECH AREA IS PROP+EXP								
4037	PROCIMPROVEFORPLASTICBONDEDEXPLS	SOULLMAN	3717	ESPD	FY80	.030	.205	0.000	0.000
TOTAL =	.236 TECH AREA IS PROP+EXP								
4061	NITROGUANIDINEPROCPT	ALITY	4496	ESPD	FY80	.063	.197	0.000	0.000
TOTAL =	.260 TECH AREA IS PROP+EXP								
4062	AUTCHMFGSYSF/MORTARINCREMENTCONTAINER	PBONNETT	4496	ESPD	FY79	.009	0.000	.875	0.000
TOTAL =	.684 TECH AREA IS PROP+EXP								
4084	OPACITY/MASSEMISSIONCORRELATION	AFRIEDMAN	4497	MSD	FY79	.111	0.000	0.000	0.000
TOTAL =	.111 TECH AREA IS PROP+EXP								
4137	AUTOMATEDLOADINGOFCENTERCOREIGNITERS	EMREZ	4162	ESPD	FY79	.670	0.000	0.000	0.000
TOTAL =	.670 TECH AREA IS PROP+EXP								
4189	HIGHFRAGSTEELPRODUCTIONPROCESS	WSHARPE	3742	MSD	FY79	.464	.644	0.000	.200
TOTAL =	1.25 TECH AREA IS PROP+EXP								
4200	INTCRYSTALLIZERFORLARGEALMUNITIONS	PBONNETT	4496	ESPD	FY80	.829	0.000	0.000	0.000
TOTAL =	.290E-01 TECH AREA IS PROP+EXP								
4210	JETCUTTINGOFENERGETICMATEPIELS	B STRAUSS	3014	ESPD	FY80	.112	.338	0.000	0.000
00	TOTAL = .450 TECH AREA IS PROP+EXP								
4225	REDWATERPOLLUTIONABATESYSTEM	JCARRAZZA	3544	ESPD	FY79	.084	.071	0.000	0.000
TOTAL =	.155 TECH AREA IS POLLUTION								
4226	ONLINEMONITORSFORWATERPOLLUTANTS	RWESTERDAHL	3749	ESPD	FY80	.050	.050	0.000	0.000
TOTAL =	.103 TECH AREA IS POLLUTION								
4231	INHOUSEREUSEOFPOLLUTIONABATEDWATERS	DFREEMAN	4256	ESPD	FY80	.088	.162	0.000	0.000
TOTAL =	.250 TECH AREA IS POLLUTION								
4236	AUTOL/CEJACKTSFORCENTERCORECHARGES	ELISCHICK	4162	ESPD	FY80	.130	.023	.459	0.000
TOTAL =	.612 TECH AREA IS LAP								
4266	MENGSPECTATESEQUIPF/MAGPOWERSUPPLY	WHOLLEY	5378	NFD	FY81	.345	0.000	0.000	0.000
TOTAL =	.345 TECH AREA IS FUZE								
4281	CONSERVATIONOFENERGYATARMYAMMOPLANTS	JSHOTINSKY	3998	ESPD	FY75	.315	.919	0.000	0.000
TOTAL =	1.23 TECH AREA IS ENERGY								
4285	INTEQUIVTESTFORSAFETYENGINEERING	PPRICE	3422	ESPD	FY76	.408	0.000	0.000	0.000
TOTAL =	.408 TECH AREA IS SAFETY								
4288	EXPLOSIVESAFEPASESENSITIVITYCRITERIA	RRINDNER	3828	ESPD	FY76	.767	0.000	0.000	0.000
TOTAL =	.767 TECH AREA IS SAFETY								
4291	BLAST-EFFECTSMUNPLANTENVIRON	PPRICE	3022	ESPD	FY76	.160	0.000	0.000	0.000
TOTAL =	.100 TECH AREA IS SAFETY								
4508	PROCESSIMPROVEOFPRESSABLERDXCOMPS	SOULLMAN	3717	ESPD	FY78	.172	.334	0.000	0.000

TOTAL = .506	TECH AREA IS PROP+EXP										
4312 INJECT HOLDING FOR PRODUCTION EXPLOSIVE LDG		L MANASSAY		6144 ESPD	FY78	.153	.126	0.000	0.000		
TOTAL = .279	TECH AREA IS LAP										
4322 DESIGN/CHAROFELECTCONSYS FOR PROOFAC		M DOORE MUS		3084 ASD	FY78	.257	.237	.008	0.000		
TOTAL = .502	TECH AREA IS MPTS										
4341 IMPROVE NITROCELLULOSE PURIFICATION PROC		M BLAIS		3637 ESPD	FY77	.170	.413	0.000	0.000		
TOTAL = .583	TECH AREA IS PROP+EXP										
4493 DEV METH FOR CONSOLA AUTO ASSY OF SMALL MINES		S LOMBARDO		5348 MSD	FY78	.110	.100	.152	0.000		
TOTAL = .392	TECH AREA IS LAP										
6736 TECH REDAGEL THROUGH COMPUTER INTEGRATED MFG		S SHART		3721 MSD	FY76	.155	0.000	.160	.025		
TOTAL = .340	TECH AREA IS MPTS										
6738 ULTRA HIGH SPEED METAL REMOVER ARTILLERY SHELL		R Pohl		3121 MSD	FY79	.117	0.000	.150	0.000		
TOTAL = .297	TECH AREA IS MPTS										
4369 AMMUNITION FOR THE 120MM TANK MAIN ARMAMENT		J MOLA		3320 ESPD	FY79	.347	.983	2.396	0.000		
TOTAL = 3.73	TECH AREA IS OTHER										
4462 MODIFIED FADF/MULTIBASE PROPELLANT		L LIMPICKI		3637 ESPD	FY77	.341	.509	0.000	0.000		
TOTAL = .650	TECH AREA IS PROP+EXP										
4469 AUTO INSERTION OF GRENADE LAYERS		R HAUSCHILD		4546 ESPD	FY78	.225	.125	0.000	0.000		
TOTAL = .356	TECH AREA IS LAP										
4310 DMS ORLCRYSTALLIZATION OF HMX/RDX		L SILBERMAN		2160 ESPD	FY75	.278	0.000	0.000	0.000		
TOTAL = .278	TECH AREA IS PROP+EXP										
7730 MFG OF SLITTING BREECH SEALS		P CASEY		5611 BWL	FY79	.453	0.000	0.000	0.000		
TOTAL = .453	TECH AREA IS MPTS										
7920 CONSO CRIT MATLS FOR GUN TUBES		P THORNTON		5517 BWL	FY80	.236	0.000	0.000	0.000		
TOTAL = .236	TECH AREA IS MPTS										
7925 BORE VACUUM BORING		P CASEY		5611 BWL	FY80	.111	0.000	0.000	0.000		
TOTAL = .111	TECH AREA IS MPTS										
7926 HOT ISOSTATIC PRESS CFLGORD COMP		P THORNTON		5517 BWL	FY80	.216	0.000	0.000	0.000		
TOTAL = .216	TECH AREA IS MPTS										
7927 GEN OF BAE MACH SURFACES		P CASEY		5611 BWL	FY80	.086	0.000	0.000	0.000		
TOTAL = .660E-01	TECH AREA IS MPTS										
7928 ROTIZED BENCHOPERS		V MONTUORI		5224 BWL	FY80	.113	0.000	0.000	0.000		
TOTAL = .113	TECH AREA IS MPTS										
8024 HIGH SPEED BRASIVE BELT GRIND		P CASEY		5611 BWL	FY80	.324	0.000	0.000	0.000		
TOTAL = .324	TECH AREA IS MPTS										
8026 APPL SYNTH QUENCHANT TO GUN TUBE		P THORNTON		5517 BWL	FY80	.143	0.000	0.000	0.000		
TOTAL = .143	TECH AREA IS MPTS										
8047 PASS THRUST STEADY REST FOR TUBE TURN		P CASEY		5611 BWL	FY78	.269	0.000	0.000	0.000		
TOTAL = .269	TECH AREA IS MPTS										
8057 DUAL RIFLING BROACH REMOVAL SYST		P CASEY		5611 BWL	FY80	.215	0.000	0.000	0.000		
TOTAL = .215	TECH AREA IS MPTS										
8059 SALVAGE GUNNONS COMP BY ELECTRODEPOS		T POCHILY		5717 BWL	FY80	.152	0.000	0.000	0.000		
TOTAL = .152	TECH AREA IS MPTS										
8060 IMP MFG PROCREL OF FINAL INSPOFCNTUBES		G GALLO		5453 BWL	FY80	.268	0.000	0.000	0.000		

TOTAL = .268 TECH AREA IS MPTS
 6165 ESTROUGHTHOUBLANKS P CASEY 5611 BWL FY80 .085 0.000 0.000 0.000
 TOTAL = .88.E-01 TECH AREA IS MPTS
 8156 LOCALPOWERCHAMBERBURNING P CASEY 5611 BWL FY80 .059 0.000 0.000 0.000
 TOTAL = .59.E-01 TECH AREA IS MPTS
 8167 CREEPFEDDERURSHFORMGRINDING P CASEY 5611 BWL FY79 .348 0.000 0.000 0.000
 TOTAL = .346 TECH AREA IS MPTS
 8208 MATERIAL HANDLING HGOODHEIM 5507 BWL FY80 .113 0.000 0.000 0.000
 TOTAL = .113 TECH AREA IS MPTS
 83-1 HALLOWCYLUUOFFMACH P CASEY 5611 BWL FY80 .069 0.000 0.000 0.000
 TOTAL = .094E-01 TECH AREA IS MPTS
 8342 KLYWAYMILLINGMACH P CASEY 5611 BWL FY80 .242 0.000 0.000 0.000
 TOTAL = .242 TECH AREA IS MPTS

*****TOTALS MILLIONS OF DOLLARS*****

IN HOUSE = 9.926
 GOCO = 5.457
 CONTRACTS = .260
 OTHER AGENCY = .225
 TOTAL = 19.670

DIVISION

ESPD	MSD	ASD	NUC+FUZE	BWL	M+MTO
4.52-	.897	.257	.345	3.516	0.000 IN HOUSE
4.47-	.744	.237	0.000	3.300	0.000 CONTRACTS
3.73-	.522	.008	0.000	0.000	0.000 GOCO
2.12-	.225	0.100	0.000	3.304	0.000 OGA
1.3.130	2.386	.502	.345	3.505	0.000 TOTAL

TECH AREAS

IN HOUSE	CONTRACTS	GOCO	OGA	TOTAL	
2.82-	1.038	1.516	.200	5.578	LAP
3.152	.237	.345	.025	3.562	MPTS
.222	.283	0.000	0.000	.505	POLLUTION
1.275	1.344	1.527	1.000	1.275	SAFETY
1.346	1.397	0.000	0.000	3.345	PROP+EXP
.345	0.000	0.300	0.000	.345	FUZE
.315	.919	0.000	0.000	1.234	ENERGY
.347	.993	2.396	0.000	3.726	OTHER

LCHSL HMT									
PN	PROJECT TITLE	ENGINEER	IN MILLIONS OF DOLLARS						
			EXT	DIV	START	IN H	GOCO	CONT	OGA
0926	NONTOXICPRESERVATIVEFORWOOD	HSTROUKOFF	2770	MSD	FY80	.344	0.000	0.000	0.000
TOTAL =	.344 TECH AREA IS OTHER								
4006	AUTOMATEDM55DETONATORPRODUCTIONEQUIP	P MONTELEONE	5389	ESPD	FY71	.131	.473	0.000	0.000
TOTAL =	.604 TECH AREA IS LAP								
4027	COMBINEDSOLVENTRECOVERY/DRYINGS-BPROP	EBOZZA	3241	ESPD	FY84	.119	.264	0.000	0.000
TOTAL =	.383 TECH AREA IS PROP+EXP								
4059	OPTOFNITROQPARTICLELESSIZE	CLEWIS	5572	ESPD	FY79	.226	.657	0.000	0.000
TOTAL =	.883 TECH AREA IS PROP+EXP								
4061	NITROGUANIDINEPROCOTP	ALITY	6496	ESPD	FY80	.220	.700	0.000	0.000
TOTAL =	.920 TECH AREA IS PROP+EXP								
4062	AUTOMFGSYSF/MORTARINGINCREMENTCONTAINER	P BONNETT	4496	ESPD	FY79	1.575	0.000	0.003	0.000
TOTAL =	1.58 TECH AREA IS LAP								
4137	AUTOMATEDLOADINGOFCENTERCOREIGNITERS	EMEREZ	4162	ESPD	FY79	.916	.184	0.000	0.000
TOTAL =	1.10 TECH AREA IS LAP								
4145	CONTROLDRYINGINAUTOSBPROPMFG	RMANNO	6522	ESPD	FY81	.333	.219	0.000	0.000
TOTAL =	.552 TECH AREA IS PROP+EXP								
4189	HIGHFRAGSTEELPRODUCTIONPROCESS	MSHARPE	3742	MSD	FY79	.220	.933	0.000	0.000
TOTAL =	1.15 TECH AREA IS MPTS								
4203	TNTCRYSTALLIZERFORLARGECAJMUNITION	P BONNETT	4496	ESPD	FY80	.302	0.000	0.000	0.000
TOTAL =	.302 TECH AREA IS PROP+EXP								
4210	JETCUTTINGOFENERGETICMATERIELS	B STRAUSS	3014	ESPD	FY80	.052	0.000	0.000	0.000
TOTAL =	.52CE-01 TECH AREA IS PROP+EXP								
4225	REDHATERPOLLUTIONABATEMENTSYSTEM	J CARRAZZA	3544	ESPD	FY79	.160	0.003	0.000	0.000
TOTAL =	.160 TECH AREA IS POLLUTION								
4226	ONLINEMONITORSFORMATERPOLLUTANTS	R WESTERDAHL	3749	ESPD	FY80	.064	.315	0.000	0.000
TOTAL =	.379 TECH AREA IS POLLUTION								
4231	INHOUSEKUUSEOFPOLLUTIONABATEDWATERS	D FREEMAN	4256	ESPD	FY80	.272	.192	0.000	0.000
TOTAL =	.464 TECH AREA IS POLLUTION								
4266	MEGINSPECTTESTEQUIP/MAGEOWERSUPPLY	M HOLLEY	6378	NED	FY80	.759	0.000	0.000	0.000
TOTAL =	.759 TECH AREA IS FUZE								
4281	CONSERVATIONOFENERGYATARMYAMMOPLANTS	J SHOTINSKY	3998	ESPD	FY75	.537	.634	0.030	0.000
TOTAL =	1.17 TECH AREA IS ENERGY								
4285	INTEQUIVTESTFORSAFETYENGRINEERING	P PRICE	3022	ESPD	FY76	.441	0.000	0.000	0.000
TOTAL =	.441 TECH AREA IS SAFETY								
4288	EXPLOSIVESAFESEPSENSITIVITYCRITERIA	R RINDER	3628	ESPD	FY76	.720	0.000	0.000	0.000
TOTAL =	.720 TECH AREA IS SAFETY								
4298	EVALOFHEXAMINERECYCLEDONHAZB-LINE	D FREEMAN	6256	ESPD	FY81	.443	.029	0.000	0.000
TOTAL =	.472 TECH AREA IS PROP+EXP								
4309	AMMUNITIONFORTHE120MMTANKMAINARMAMENT	J MOLA	3320	ESPD	FY79	3.071	.917	0.000	0.000

TOTAL =	3.99	TECH AREA IS OTHER							
4328	BULKPROP SHIPPING CONTAINER	DOOYLE	5358 MSD	FY78	.323	0.000	0.000	0.000	
TOTAL =	.323	TECH AREA IS OTHER							
4341	IMPROVE NITROCELLULOSE PURIFICATION PROC	M BLAIS	3637 ESPD	FY77	.519	.246	0.000	0.000	
TOTAL =	.765	TECH AREA IS PROP+EXP							
4449	PROCESS IMPROVEMENTS FOR GOMPC	H RICCI	3760 ESPD	FY78	.051	.546	0.000	0.000	
TOTAL =	.597	TECH AREA IS PROP+EXP							
4508	PROCESS IMPROVE OF PRESSABLE RDX COMPS	S DOLLMAN	3717 ESPD	FY78	.050	.213	0.000	0.000	
TOTAL =	.263	TECH AREA IS PROP+EXP							
6716	DEV OF COMPUTER AIDED MFG OF FORM PNS/CUR/FUMPTSDSGN	F LEE	3679 MSD		.157	0.000	0.000	0.000	
TOTAL =	.157	TECH AREA IS MPTS							
6738	ULTRAHIGH SPEED METAL REMOVER ARTILLERY SHELL	R POHL	3121 MSD	FY79	.057	0.000	0.000	0.000	
TOTAL =	.570E-01	TECH AREA IS MPTS							
7724	GROUP TECHNOLOGY OF WEAPONS	H GOODHEIM	5849 BWL	FY79	.224	0.000	0.000	0.000	
TOTAL =	.224	TECH AREA IS MPTS							
7916	APPLOF LOW COST MANURE MATLS	H GOODHEIM	5849 BWL	FY79	.168	0.000	0.000	0.000	
TOTAL =	.168	TECH AREA IS MPTS							
7925	BORE EX VACUUM BORING	P CASEY	5611 BWL	FY80	.248	0.000	0.000	0.000	
TOTAL =	.248	TECH AREA IS MPTS							
7927	GEN OF BASE MACH SURFACES	P CASEY	5611 BWL	FY80	.137	0.000	0.000	0.000	
TOTAL =	.137	TECH AREA IS MPTS							
7928	ROBOTS IN EOB ENHOPRS	V MONTUORI	5224 BWL	FY80	.267	0.000	0.000	0.000	
TOTAL =	.267	TECH AREA IS MPTS							
7948	ESTAB CUTTING FLUID CNTL SYST		BWL	FY81	.163	0.000	0.000	0.000	
TOTAL =	.163	TECH AREA IS MPTS							
8030	MFG GUIDE FOR ELASTOMERIC SEALS		BWL	FY81	.085	0.000	0.000	0.000	
TOTAL =	.050E-01	TECH AREA IS MPTS							
8034	MFG SHGPFLK FEEDBACK SYS		BWL	FY81	.296	0.000	0.000	0.000	
TOTAL =	.296	TECH AREA IS MPTS							
8035	GOAT TUBE SUPPORT SLEEVES W/ BEADING CHATLS		BWL	FY81	.200	0.000	0.000	0.000	
TOTAL =	.200	TECH AREA IS MPTS							
8102	APPLOF POWDER METAL FOR GE TOH PNS COMPS	P THORNTON	5249 BWL	FY81	.163	0.000	0.000	0.000	
TOTAL =	.163	TECH AREA IS MPTS							
8103	HIGH VELOCITY MACHINING	H GOODHEIM	5849 BWL	FY81	.068	0.000	0.000	0.000	
TOTAL =	.680E-01	TECH AREA IS MPTS							
8105	ESTRONGHTHD BLANKS	P CASEY	5611 BWL	FY80	.307	0.000	0.000	0.000	
TOTAL =	.307	TECH AREA IS MPTS							
8106	LEGAL POWDER CHAMBER BORING	P CASEY	5611 BWL	FY80	.159	0.000	0.000	0.000	
TOTAL =	.159	TECH AREA IS MPTS							
8107	CREEP FEED CRUSH FORM GRINDING	P CASEY	5611 BWL	FY79	.073	0.000	0.000	0.000	
TOTAL =	.730E-01	TECH AREA IS MPTS							
8116	SQUEEZE CAST OF CANNON COMPS	H POWIS	5443 BWL	FY81	.280	0.000	0.000	0.000	
TOTAL =	.280	TECH AREA IS MPTS							
8119	DIM STABILITY OF VIBRATORY ENERGY	R FARRARA	5507 BWL	FY81	.099	0.000	0.000	0.000	

TOTAL = .99E-01 TECH AREA IS MPTS
 8120 APPLOFADATPIV CONTROL TELM RMEINHART 5872 BNL FY81 .225 C.000 C.000 C.000
 TOTAL = .226 TECH AREA IS MPTS
 8135 2NOCRUEWMFGFORHPNSC OMPB BNL FY81 .750 C.000 C.000 C.000
 TOTAL = .750 TECH AREA IS MPTS
 8136 IMPVQIMPULSEPROGRMSFORHYDRAULICSIMULATORS BNL FY81 .680 C.000 C.000 C.000
 TOTAL = .800E-01 TECH AREA IS MPTS
 8151 PORTABLEENGRAVINGSYS VMONTUORI 5224 BNL FY81 .084 C.000 C.000 C.000
 TOTAL = .846E-01 TECH AREA IS MPTS
 8152 IMPVDANDESTRAIGHMINERSFORCHROMIUMPLTG TPOCHILY 5717 BNL FY81 .268 C.000 C.000 C.000
 TOTAL = .280 TECH AREA IS MPTS
 8153 IMPVQJUNTUBEHTCAPFORROTARYFORG FHEISER 5849 BNL FY81 .336 C.000 C.000 C.000
 TOTAL = .336 TECH AREA IS MPTS
 8154 DISTRIBUTEDNC GANDERSON 5719 BNL FY81 .337 C.000 C.000 C.000
 TOTAL = .337 TECH AREA IS MPTS
 8341 HOLLOWCYLCUTOFFMACH P CASEY 5611 BNL FY81 .164 C.000 C.000 C.000
 TOTAL = .164 TECH AREA IS MPTS

*****TOTALS MILLIONS OF DOLLARS*****

IN HOUSE =	17.275
GOCO =	6.522
CONTRACTS =	8.000
OTHER AGENCY =	0.000
TOTAL =	23.797

DIVISION

ESPO	MSD	ASD	NUC+FUZE	BNL	M+MTD	
10.202	1.101	0.000	.759	5.213	0.000	IN HOUSE
5.589	.933	0.000	0.000	0.000	0.000	CONTRACTS
0.000	0.000	0.000	0.000	0.000	0.000	GOCO
6.000	0.000	0.000	0.000	0.300	0.000	OGA
15.791	2.034	0.000	.759	5.213	0.000	TOTAL

TECH AREAS

IN-HOUSE	CONTRACTS	GOCO	OGA	TOTAL	
2.846	1.314	0.000	0.000	4.152	LAP
5.647	.933	0.000	0.000	6.580	MPTS
.496	.507	0.000	0.000	1.003	POLLUTION
1.161	0.000	0.000	0.000	1.161	SAFETY
2.189	2.217	0.000	0.000	4.306	PROP+EXP
.759	0.000	0.000	0.000	.759	FUZE
.537	.634	0.000	0.000	1.171	ENERGY
3.738	.917	0.000	0.000	4.655	OTHER

LCWSL MMT

PN	PROJECT TITLE	ENGINEER	FY82	IN MILLIONS OF DOLLARS					
			EXT	DIV	START	IN H	GOCO	CONT	OGA
4027	COMBINED SOLVENT RECOVERY/DRYINGS-BPROP	EBOZZA	3241	ESPD	FY80	.423	0.000	0.000	0.000
TOTAL =	.423 TECH AREA IS PROP+EXP								
4033	CAUSTIC RECOVERY/FRSODIUM NITRATE SLUDGE	MERICCI	2160	ESPD	FY80	.286	0.000	0.000	0.000
TOTAL =	.286 TECH AREA IS PROP+EXP								
4061	NITROGUANIDINE PROCORT	ALITY	4496	ESPD	FY80	.944	0.000	0.000	0.000
TOTAL =	.944 TECH AREA IS PROP+EXP								
4062	AUTOMFG/SYSF/MOTAR INCREMENT CONTAINER	PBONNETT	4496	ESPD	FY79	1.439	0.000	0.000	0.000
TOTAL =	1.44 TECH AREA IS LAP								
4071	EXPLOSIVE DUST HAZARD IN MUNITION SPPLNTS	RRINDNER	4469	ESPD	FY80	.322	0.000	0.000	0.000
TOTAL =	.322 TECH AREA IS SAFETY								
4078	UPGRADE MELT POUR SAFETY/READINESS/PROD	PSKERCHOCK	4252	ESPD	FY82	.875	0.000	0.000	0.000
TOTAL =	.875 TECH AREA IS PROP+EXP								
4086	REPROCESSING EXPLOSIVE FINES/DRILL SCRAP	CANDERSON	5839	ESPD	FY80	.633	0.000	0.000	0.000
TOTAL =	.633 TECH AREA IS PROP+EXP								
4138	EQUIPF/AUTOPROC OF ADDITIVE LINER	RHARD	2756	ESPD	FY82	.379	0.000	0.000	0.000
TOTAL =	.379 TECH AREA IS LAP								
4145	CONT LRYING IN AUTOS BPROP/MFG	RMANNO	6522	ESPD	FY82	.272	0.000	0.000	0.000
TOTAL =	.272 TECH AREA IS PROP+EXP								
4189	HIGH FRAG STEEL PRODUCTION PRCCES	WSHARPE	3742	MSD	FY79	.493	0.000	0.000	0.000
TOTAL =	.493 TECH AREA IS MPTS								
4224	ENERGY CONNS IN SOL RECOVERY OPERATIONS	EKRAJKOWSKI	3241	ESPD	FY82	.229	0.000	0.000	0.000
TOTAL =	.229 TECH AREA IS POLLUTION								
4227	DISPOSAL OF WASTE WATER TREATMENT SLUDGE	OCOLITTI	3544	ESPD	FY82	.431	0.000	0.000	0.000
TOTAL =	.431 TECH AREA IS POLLUTION								
4229	ADVANCED O/P INK WATER TREATMENT	B JACKSON	3749	ESPD	FY82	.379	0.000	0.000	0.000
TOTAL =	.379 TECH AREA IS POLLUTION								
4231	INHOUSE REUSE OF POLLUTION ABATED WATERS	DFREEMAN	4256	ESPD	FY80	.303	0.000	0.000	0.000
TOTAL =	.303 TECH AREA IS POLLUTION								
4237	CONT INT FRC ENGINEERING	RWOLFF	4122	ESPD	FY73	.354	0.000	0.000	0.000
TOTAL =	.354 TECH AREA IS PROP+EXP								
4251	AUTOMFG OF DELAY ASSY F/H549	LWEINER	5538	ESPD	FY82	.993	0.000	0.000	0.000
TOTAL =	.993 TECH AREA IS LAP								
4253	PACK/UNPACK MORTAR FROP CHARGES	OANDERSON	4626	ESPD	FY80	.614	0.000	0.000	0.000
TOTAL =	.614 TECH AREA IS PROP+EXP								
4267	IMPROVED PROC FOR GRANULAR COMP3	LSOTSKY	2160	ESPD	FY75	.757	0.000	0.000	0.000
TOTAL =	.757 TECH AREA IS PROP+EXP								
4281	CONSERVATION OF ENERGY AT ARMY NHN PLANTS	JSHOTINSKY	3998	ESPD	FY75	1.690	0.000	0.000	0.000
TOTAL =	1.69 TECH AREA IS ENERGY								
4285	TEST EQUIV FOR SAFETY ENGINEERING	PPRICE	3022	ESPD	FY76	.251	0.000	0.000	0.000

TOTAL = .251 TECH AREA IS SAFETY
 4291 BLASTEFFECTSINMUNPLANTENVIRONMENT APRICE 3822 ESPD FY76 .359 0.000 0.000 0.000

TOTAL = .359 TECH AREA IS SAFETY
 4295 TERTIARYTREATMENT BJACKSON 4488 ESPD FY82 .152 0.000 0.000 0.000

TOTAL = .152 TECH AREA IS POLLUTION
 4298 EDALOFHEXAMINERECYCLEDONHAAPD-LINE DFREEMAN 4256 ESPD FY82 .399 0.000 0.030 0.000

TOTAL = .399 TECH AREA IS PROP+EXP
 4309 AMMUNITIONFORTHE120MMTANKMUNARMAMENT JMOLA 3320 ESPD FY79 3.948 0.000 0.000 0.000

TOTAL = 3.95 TECH AREA IS OTHER
 4311 DEVINITIALAUTOPROOFGRALPM692MINEDISPSYST LWEINER 6506 ESPD FY76 .466 0.000 0.000 0.000

TOTAL = .466 TECH AREA IS LAP
 4318 NITRATEESTERENVIRONMENTIMPACT RRINDNER 6119 ESPD FY82 .218 0.000 0.000 0.000

TOTAL = .218 TECH AREA IS POLLUTION
 4363 DEVAUTOPROBEQUIPF/SEALM55 PMONTELEONE 5389 ESPD FY82 .672 0.000 0.000 0.000

TOTAL = .672 TECH AREA IS LAP
 4369 IMPVDPROJCAVITYSURFACE DGUSTAD 2522 MSD FY82 .557 0.000 0.000 0.000

TOTAL = .557 TECH AREA IS MPTS
 4374 EXPLOSAFETYSHELIDS JCALTAGIRONE 6119 ESPD FY82 .197 0.000 0.000 0.000

TOTAL = .197 TECH AREA IS SAFETY
 4385 CENTERCOREIGNITER ELISCHICK 4162 ESPD FY82 .542 0.000 0.000 0.000

TOTAL = .542 TECH AREA IS LAP
 4399 INSTRUIN-PROCESSMEAASSOLIDLIQUIDTNT RMANNO 6522 ESPD FY82 .166 0.000 0.000 0.000

TOTAL = .166 TECH AREA IS PROP+EXP
 4404 IMPVDRRECOPACETICACIOINRDXMFG IWEISMAN 3859 ESPD FY82 .250 0.000 0.000 0.000

TOTAL = .250 TECH AREA IS PROP+EXP
 4406 IMPVDEYILDOFMHM RGOLOSTEIN 6522 ESPD FY82 .655 0.000 0.000 0.000

TOTAL = .655 TECH AREA IS PROP+EXP
 4422 L/APROTOEQUIPCOMBEFFECTSMUN JSMARZ 5727 ESPD FY82 1.162 0.000 0.000 0.000

TOTAL = 1.16 TECH AREA IS LAP
 4429 IMPRS&F/USEOFGOMAHAVAILCOMPWFHTEQUIP OANDERSON 4626 ESPD FY82 .379 0.000 0.000 0.000

TOTAL = .379 TECH AREA IS SAFETY
 4445 DETONATERWASTETREATMENT OCOLITTI 3544 ESPD FY82 .428 0.000 0.000 0.000

TOTAL = .628 TECH AREA IS POLLUTION
 4446 ADVAIREMISSIONABATEMENT JCARRAZZA 6349 ESPD FY82 .418 0.000 0.000 0.000

TOTAL = .418 TECH AREA IS POLLUTION
 4449 PROCIMPROVEMENTFORCOMPC4 HRICCI 3760 ESPD FY78 .531 0.000 0.000 0.000

TOTAL = .531 TECH AREA IS PROP+EXP
 4452 REPROCESSALOGDEMILEXPL LMENABLEH 3239 ESPD FY82 .274 0.000 0.000 0.000

TOTAL = .274 TECH AREA IS PROP+EXP
 4453 DETPRFAGATIONAVOIDF/ENERGETICMATS ESPD FY82 .201 0.000 0.000 0.000

TOTAL = .201 TECH AREA IS SAFETY
 4492 WATERDELUGSYSAAPLIMNUNPLANTS RRINDNER 6119 ESPD FY82 .303 0.000 0.000 0.000

TOTAL = .303 TECH AREA IS POLLUTION
 7730 MFGCFSPLITRINGBRECHSEALS PCASEY 5611 BML FY79 .106 0.000 0.000 0.000

TOTAL = .106	TECH AREA IS MPTS							
7926 MOTISOSTATICPRESSCFLGORDCOMP		P THORNTON	5617 BWL	FY80	.290	0.000	0.000	0.000
TOTAL = .280	TECH AREA IS MPTS							
8024 HIGH SPEED ABRASIVE BELT GRIND		P CASEY	5611 BWL	FY80	.148	0.000	0.000	0.000
TOTAL = .140	TECH AREA IS MPTS							
8350 RECYCLE OF SCRAPER TUBES BY ISR		V COLANGELO	5617 BWL	FY82	.201	0.000	0.000	0.000
TOTAL = .201	TECH AREA IS MPTS							
8062 RAPID INTERNAL THREADING		J RODD	5946 BWL	FY80	.338	0.000	0.000	0.000
TOTAL = .338	TECH AREA IS MPTS							
8102 POWDER METALLURGY FCRGHPNSCOMPS		P THORNTON	4129 BWL	FY81	.131	0.000	0.000	0.000
TOTAL = .131	TECH AREA IS MPTS							
8103 HIGH VELOCITY MACHINING		H GOODHEIN	5507 BWL	FY82	.036	0.000	0.000	0.000
TOTAL = .360E-01	TECH AREA IS MPTS							
8106 LGCL POWDER CHAMBER BIRING		G CONLON	5611 BWL	FY80	.071	0.000	0.000	0.000
TOTAL = .710E-01	TECH AREA IS MPTS							
8117 SHAPED CASTINGS OF ESRS STEEL		V COLANGELO	5517 BWL	FY82	.204	0.000	0.000	0.000
TOTAL = .264	TECH AREA IS MPTS							
8151 PORTABLE ENGRAVING SYS		V MONTUORI	5224 BWL	FY81	.158	0.000	0.000	0.000
TOTAL = .168	TECH AREA IS MPTS							
8237 CARRIER HOUSING MACHINING OFF HOLE		R DEMEO	5737 BWL	FY82	.101	0.000	0.000	0.000
TOTAL = .101	TECH AREA IS MPTS							
8238 BORING BREECH RING LUGS		A WAKEULENKO	5611 BWL	FY82	.200	0.000	0.000	0.000
TOTAL = .200	TECH AREA IS MPTS							
8239 IMPVD MACHINING OF RAILS		G CONLON	5737 BWL	FY82	.250	0.000	0.000	0.000
TOTAL = .250	TECH AREA IS MPTS							
8241 COMPUTER DIAG CTL FOR BORE GUIDANCE		M SULLIVAN	5517 BWL	FY82	.303	0.000	0.000	0.000
TOTAL = .303	TECH AREA IS MPTS							
8242 DUAL PRESS STRAIGHTENING GUN TUBE		R FARRARA	5507 BWL	FY82	.118	0.000	0.000	0.000
TOTAL = .118	TECH AREA IS MPTS							
8243 COMPUTER CTL FOR ELECTRODE POSITION SYS		I POCHILY	5187 BWL	FY82	.296	0.000	0.000	0.000
TOTAL = .296	TECH AREA IS MPTS							
8244 OPTHEAT TREATMENT OF RCTRY FORGE TUBES		C CALDERONE	4179 BWL	FY82	.286	0.000	0.000	0.000
TOTAL = .286	TECH AREA IS MPTS							
8245 APPLOF EROSION RESIST LC CHROMIUM PLATE		G D ANDREA	5003 BWL	FY82	.237	0.000	0.000	0.000
TOTAL = .237	TECH AREA IS MPTS							
8246 GAS CHECK SEAT FINISHING		C CLAROSS	5590 BWL	FY82	.151	0.000	0.000	0.000
TOTAL = .151	TECH AREA IS MPTS							
8252 INDUCTION HEATING OF VARYING DIAPREFORM		D CONCORDIA	5872 BWL	FY82	.237	0.000	0.000	0.000
TOTAL = .237	TECH AREA IS MPTS							
8253 MACH TOOL DYN MEAS & DIAG		R MHARTON	5872 BWL	FY82	.187	0.000	0.000	0.000
TOTAL = .187	TECH AREA IS MPTS							
8256 IMPVD MEG PROC FOR FIRE CTL REG		B BROSE	5611 BWL	FY82	.257	0.000	0.000	0.000
TOTAL = .257	TECH AREA IS MPTS							
8341 HALLOW CYC CUTOFF MACH		J RODD	5946 BWL	FY80	.600	0.000	0.000	0.000

TOTAL = .600 TECH AREA IS MPTS

***** TOTALS MILLIONS OF DOLLARS *****

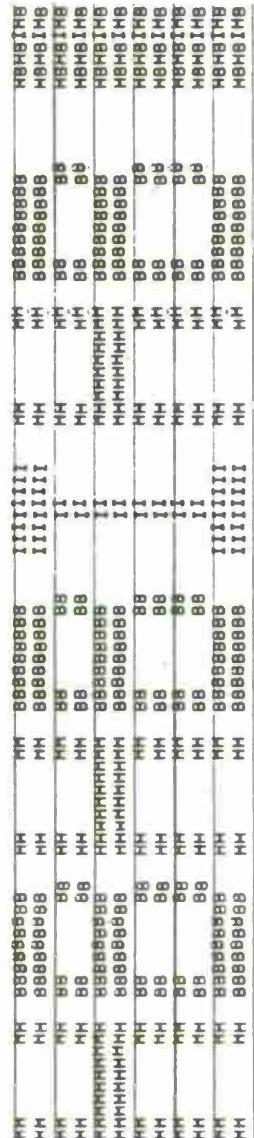
IN HOUSE =	29.256
GOCO =	0.000
CONTRACTS =	3.000
OTHER AGENCY =	0.000
TOTAL =	29.256

DIVISION

ESPD	MSD	ASD	NUC+FUZE	BWL	M+MTO	
23.298	1.650	0.000	0.000	4.908	0.000	IN-HOUSE
0.000	0.000	0.000	0.000	0.000	0.000	CONTRACTS
0.000	0.000	0.000	0.000	0.000	0.000	GOCO
0.000	0.000	0.000	0.000	0.000	0.000	OGA
23.298	1.650	0.000	0.000	4.908	0.000	TOTAL

TECH AREAS

IN-HOUSE	CONTRACTS	GOCO	OGA	TOTAL	
5.724	0.000	0.000	0.000	5.724	LAP
5.887	0.000	0.000	0.000	5.887	MPTS
2.861	0.000	0.000	0.000	2.861	POLLUTION
1.709	0.000	0.000	0.000	1.709	SAFETY
7.437	0.000	0.000	0.000	7.437	PROP+EXP
0.600	0.000	0.000	0.000	0.600	FUZE
1.690	0.000	0.000	0.000	1.690	ENERGY
3.948	0.000	0.000	0.000	3.948	OTHER



126476	1BLASTENVIR(APPLTECH)	JAN76/JAN76JUN76/JUN76	E
126476	2BLASTSUPPRESSION	JAN76/JAN76JUL76/JUL76	E
126476	3FRAGENVIA	JAN76/JAN76DEC76/DEC76	E
126476	4FRAGSUPPRESSION	JAN76/JAN76DEC76/DEC76	E
126476	5ANALOGROUPSHTELDATA	JAN76/JAN76OCT77/JAN78	E
126476	6STRUCTURALRESPONSE	JAN76/JAN76DEC76/DEC76	E
126476	7FINISHES(SUPPORTENGR)	JAN76/JAN76MAR76/MAR76	E
126476	2LINERS	JAN76/JAN76MAR77/MAR77	E
126476	3UTILITIES	JAN76/JAN76SEP76/DEC76	E
126476	4REHABILITATION+REPAIR	JAN76/JAN76SEP76/DEC76	E
126476	5ENVIRONMENTFACTORS	JAN76/JAN76SEP76/DEC76	E
126476	1PLANTSTUDY(OPERAPPLS)	DEC76/DEC76OCT76/OCT76	E
126476	2ECONOMAL	MAR75/MAR75DEC76/DEC76	E
126476	3APPALANL	MAR75/MAR75SEP77/MAR77	E
126476	1PREPAREPLANS(MDBK)	JUL76/JUL76JUL76/JUL76	E
126476	2PREPDRAFT	AUG76/SEP76MAY77/MAY77	E
126476	3REVIEWDRAFT	JUN77/AUG77JUL77/AUG77	E
126476	4SAFETYAPPVSUBMISSION	SEP77/SEP77OCT77/OCT77	E
126477	1HODGROUP3SHIELD(OPERAPPLS)	DEC76/DEC76JUN77/AUG77	E
126477	2DSSNGROUP1SHIELD	DEC76/DEC76JUN77/SEP77	E
126477	1PRPTESTSGROUP5SHIELD(SUPPORTENGR)	FEB77/FEB77JUN77/FEB78	E
400071	STUDYOFAVAILTECH+EQUIPFORDETPROD	NOV72/NOV72JUN73/JUN73	E
400071.73	CONCEPTOFNEWTECHNIQUES+EQUIP	MAR73/MAR73JUN74/JUN74	E
400073.74	EVALUATECONCEPTPROFMODELS	AUG73/AUG73DEC74/DEC74	E
400074.77	CONDUCTFREEFLOWNOQUALTESTPHRG	AUG76/AUG76JUL78/MAR78(ADD)	E
400074.77	LODELETW/PA130SHIPSTORE+TEST	MAR79/MAR79DEC80/(DEL)	E
400075.76	AWARDCONTRACT	FEB75/JAN75AUG75/DEC75	E
400076	DEVELOPSYSTEMCONCEPT	JAN76/JAN76APR76/NOV76	E
400076	DEVELOPprototypeconcept	SEP75/JUN76DEC75/MAY76(ADD)	E
400076	APPVSYSTEMCONCEPT	(DEL)	E
400076	APPVCONCEPT	NOV75/MAY76APR76/MAY76	E
400076	DESIGNPILOTLINE	APR76/JUN76OCT76/DEC76	E
400076	APPVPILOTLINEDESIGN	JUL76/MAR77OCT76/MAR77	E
400076	PREPARESCOPEOFWORK(PHASE1)	SEP76/SEP76DEC76/DEC76(ADD)	E
400076.77	DESGNBUILD+TESTINSPCTEQUIP	JUL78/DEC78/(DEL)	E
400076.77	BUILDPILOTLINE	OCT76/MAR78(DEL)	E
400076.77	COMPIONCHARACTERIZATIONPHRG	MAR76/MAR76OCT77/NOV77(ADD)	E
400077.76	APPVDESIGN	JUL76/MAR77OCT76/MAR77(ADD)	E
400077	LOADERCONCEPTCOMPARISON	OCT76/OCT76JUN77/MAR77(ADD)	E
400077	AWARDCONTRACT(PHASE1)	JUN78(DEL)	E
400077	CONCDSGNAUTOINSPCTEQUIPFOREMPTYCUPSEPY77/SEP77MAY78/MAR78(ADD)	E	
400077.78.79	FAB+TESTAUTOINSPCTEQUIPFOREMPTYCUPS	MAR78/MAR78SEP80/(ADD)	E
400077	CONCDSGNAUTOINSPCTEQUIPPFORASSEMBDET	SEP77/SEP77MAY78/JAN79(ADD)	E
400077.78.79	FAB+TESTAUTOINSPCTEFORASSEMBDET	MAR78/APR79DEC80/(ADD)	E
400077	CONCDSGNAUTOPKG+PACKEQUP	OCT77/NOV77MAY79/(DEL)	E
400077.78.79	FAB+TESTAUTOPKG+PACKEQUP	MAR79/SEP80/(DEL)	E
400077	INITIATEHOTMELTSEALOFETSPROGRAM	OCT77/APR78/(DEL)	E
400077.78.79	LOADSEAL+TESTHOTMELTSEALDET+REV+OP	APR78/FEB80/(DEL)	E
400077	MONITORMULTITORULLADERPROG	JUL77/JUL77OCT79/DEC79(ADD)	E
400077	CONDIMETERACCURRLIFE+H2OTESTOFIOWABALL	OCT77/OCT78/(DEL)	E
400077.78.79	DEVPROCTOOL+EQUIPFORULTRASONICSEALDETNOV78/SEP78SEP807	(ADD)	E
400077.78	FAB+TESTAUTODETLACQUERMECHANISM	SEP77/SEP77MAY80/(DEL)	E
400077.78	FAB+TESTIMPVDVCUUMSYST	SEP77/SEP77AUG79/AUG79(ADD)	E
400078	REVISEPILOTLINEDESIGN	SEP78/FEB79(DEL)	E
400078	AWARDCONTRACT(PHASE2)	NOV78/(DEL)	E
400078	TEST+DEBUG	APR78/AUG78/(DEL)	E
400078	AWARDCONTRACT(PHASE3)	NOV79/(DEL)	E
400078	ACCEPTTEST	AUG78/SEP78/(DEL)	E
400078	ASSEMTEST+MODIFY	SEP79/DEC79/(DEL)	E
400078	SHIP+INSTALLATARRADCOM	SEP78/MAR79/(DEL)	E
400078.79	TEST+EVALATARRADCOM	APR79/AUG79/(DEL)	E
400078	PROTOTYPETECHDATAPACK	SEP78/OCT78/(DEL)	E
400078.79	FAB+TESTAUTOEXPLOSIVES+RESUPPLYSYST	SEP77/SEP77JUL78/(DEL)	E
400078	FAB+TESTINPVDMACHUNLOAD+TRAYDEVICE	SEP77/JUL78/(DEL)	E
400078	FINALREPORT/TDP	APR79/MAR81/(DEL)	E
400079.80.81	FINALREPORT/TDP	APR79/APR79SEP81/(ADD)	E

400080	FINAL REPORT	AUG79/	NOV79/	(DEL) E
400080,81	SYSTEM INTEGRATION	MAR80/	MAR81/	(ADD) E
400779,80	METERING ACCURACY	FEB79/	FEB79/APR80/MAR80	(ADD) E
400777	FINAL 301RPT		SEP80/	(ADD) E
400778	FINAL 301RPT		SEP80/	(ADD) E
400779	FINAL 301RPT		DEC80/	(ADD) E
400780	FINAL 301RPT		JUN81/	(ADD) E
400081	OVERALL PROJ FINAL 301RPT		SEP81/	(ADD) E
400779	RECEIPT OF FUNDS	JAN79/	JAN79/	E
400779	ENGINEERING DESIGN	JAN79/	APR79/	E
400779	EQUIP PROCUREMENT	MAR79/	JUN79/	E
400779	SOP PREPARATION	MAY79/	JUN79/	E
400779	EQUIP INSTALLATION	JUN79/	JUL79/	E
400779,80	EQUIP OPERATION	AUG79/	FEB80/	E
400780	DATA EVALUATION	OCT79/	FEB80/	E
400780	ECONOMIC EVALUATION	JAN80/	FEB80/	E
400780	DESIGN REVIEW	FEB80/	APR80/	E
400780	PREPARE FINAL ENGINEERING REPORT	FEB80/	APR80/	E
400974	ANAL+DEFASSY+PACK CRITERIA	AUG73/	SEPT3/OCT73	E
400974	PROJ SYST CONCEPT COMP+APPVD	SEP73/	SEP73/NOV73/NOV73	E
423680	DELTOLoadPLANT	MAY81/	JUN81/	E
423680	DELTDP FINAL TECHRPT		SEP81/	E
400974	PREPARE INITIAL SCOPE OF WORK	NOV73/	NOV73/NOV73/JAN74/JAN74	E
400974	PREPARE SCOPES OF WORK FOR TASKS 1+2+3	NOV73/	NOV73/NOV73/MAR74/MAR74	(ADD) E
400974	HIGHER AUTHORITY PROCEEDED DECISION	JAN74/	JAN74/FEB74/FEB74	E
400974	MODIFY SCOPE OF WORK	FEB74/	FEB74/MAR74/MAR74	E
400974	AWARD CONTRACT	FEB74/	JUN74/	(DEL) E
400974	AWARD CONTRACT FOR TASK 1	FEB74/	FEB74/OCT74/NOV74	(ADD) E
400974	MODIFY SCOPE OF WORK FOR TASK 2	JUL74/	JUN74/SEP74/SEP74	(ADD) E
400974	PROTOTYPE DESIGN SUBMITTED	AUG74/	SEP74/	(DEL) E
400974,75	AWARD CONTRACT FOR TASK 2	SEP74/	SEP74/JUL75/JUN75	(ADD) E
400974	PROTOTYPE DESIGN APPVD	SEP74/	OCT74/	(DEL) E
400974	DSGN+BUILD PROTOEQUIP	OCT74/	MAY75/	(DEL) E
400974	TEST PROTOEQUIP	MAY75/	JUN75/	(DEL) E
400974	INSTALL PROTOEQUIP ON ASSY LINE	JUN75/	AUG75/	(DEL) E
400974	TEST+EVALUATE PROTOEQUIP	AUG75/	DEC75/	(DEL) E
400974	TECH DATA PACKAGE COMPLETE	OCT74/	JUN76/	(DEL) E
400974,75	DSGN+FAB+TEST PROTOEQUIP FOR TASK 2	JUL75/	JUN75/NOV77/JUN78	(ADD) E
400974,75	TECH DATA PKG FOR TASK 2	OCT74/	NOV74/NOV74/FEB78/OCT79	(ADD) E
400974,75,76	INSTALL COMPLETE F	NOV77/	DEC77/	(DEL) E
400974,75,76	PROTOTYPE ACCEPTED	DEC77/	JAN78/JAN78/AUG78	(ADD) E
400974,75,76	ALL WORK COMPLETE F	JAN78/	DEC78/MAR78/FEB80	(ADD) E
401273	DSGN EQUIP	DEC72/	DEC72/DEC72/SEP73/AUG73	E
401273	PROCURE EQUIP	JUN73/	NOV73/JUN74/FEB76	E
401273	ROB BUILDING	MAR74/	JAN75/JUN74/NOV75	E
401273	INSTALLEQUIP	JUN74/	OCT76/SEP74/FEB76	E
401273	HAZARDS ANAL	FEB73/	FEB73/FEB73/DEC74/FEB76	E
401275	RCPT OF ADD FUND	NA/NA	MAR75/MAR75	E
401275	INSTALLEQUIP	JUL75/	FEB76/DEC75/DEC76	E
401275	DEBUG SYST	SEP76/	SEP76/SEP76/SEP77/NOV79	(ADD) E
401275	EVAL SYST (INERT)	SEP76/	SEP76/AUG78/AUG79/DEC79	(ADD) E
401275	EVAL SYST (LIVE)	DEC79/	DEC79/	(DEL) E
401275	PREP PRELIM DSGN CRITERIA	JAN79/	JAN79/JAN79/DEC77/MAY80	(ADD) E
401275	HAZARD ANALYSIS	FEB76/	FEB76/FEB76/JUN76/JUN80	E
401275	GUM FIRINGS	DEC79/	MAR79/	(DEL) E
401275	FINAL RPT	APR76/	APR76/APR76/JUN76/JUN80	E
402477	CORUSTOTI 15MMH&B3 PROJ	OCT77/	OCT77/OCT77/JUN79/	M
402479	PREP SCOPES OF WORK	AUG78/	AUG78/AUG78/SEP78/MAR79	M
402479	RECEIVE FUNDS	OCT78/	DEC78/DEC78/OCT78/DEC78	M
402479	AWARD CNT	APR79/	APR79/APR79/SEP79/SEP79	M
402479	BUILD MOCK UPS+PROVE OUT	FEB79/	APR79/	(DEL) M
402479	MAKE DETAILED DWGS+SPEC'S	SEP79/	SEP79/SEP79/JUN80/	M
402479	REV'D DWGS+SPEC'S	FEB80/	FEB80/FEB80/JUL80/	M
402479	BUILD PROTO+DERUGG	JUL80/	FE881/	M
402479	ACCEPT OF PROTO	FEB81/	JUN81/	M
402479	PRE TDP	MAY81/	AUG81/	M

402479	REVIEW/TUP	AUG81/	SEP81/	
403380	DET THERMAL DECO-PDSGNPAR	JAN80/FEB80/APR80/APR80		E
403380	DET ENGR PAR FOR CONV NO 2 NITRIC ACID	MAR80/APR80/JUN80/		E
403380	SURF INDUSTRIAL EQUIP	APR80/APR80/JUN80/		E
403380	DSGN CRIT	JUN80/	OCT80/	E
403380	USGN PILOT PLANT	JUL80/	OCT80/	E
403380	PROJ PHYS COMPL	OCT80/	OCT80/	E
403380	PROJ FISCAL COMPL	NOV80/	NOV80/	E
403380	PROJ CLOSEOUT	JAN81/	JAN81/	E
404171	ESTAB EQUIP DSGN PREP SCOPE INT GW/AUTOLINE	APR72/JAN72/SEP72/JUN74		E
404171,75,76	AWARD CONTRACT (60MM+81MM)	JUN72/OCT75/JUN72/MAR76		E
404171	TEST PROTO AT CONTRACTOR (60MM)	FEB73/	MAR73/	(DEL) E
404171	USGN MODIFICATIONS (81MM)	MAR73/	APR73/	(DEL) E
404174	INSTALL PHOTO AT ACO (60MM)	APR73/	MAY73/	(DEL) E
404174	TEST DSGN MOD + EVAL RESULTS (60MM)	JUN73/	JUL73/JAN80	(DEL) E
404174	APPROVE FINAL REPORT (60MM+81MM)	AUG73/	AUG73/	(DEL) E
404174	FINALIZE TDP (60MM)	SEP73/	OCT73/	(DEL) E
404174	FINALIZE TDP (81MM)	OCT73/	NOV73/	(DEL) E
404175,76	DSGNEQUIP (60MM)	JUN72/MAR76/SEP72/		(DEL) E
404175,76	CONCEPT/DSGNEQUIP (60MM+81MM)	APR76/MAR76/DEC77/JUL78 (ADD)		E
404176	BUILD EQUIP (60MM) PWD RWEIGH FILL HISPU SC	NOV77/DEC77/JAN79/MAY79 (ADD)		E
404178	AMEND CONTRACT FOR BUILD REMAIN INSTASPACK O	JAN78/JAN78/JUN78/JUL78 (ADD)		E
404178	BUILD REMAIN PROTOSTASPACK OUT	JUL78/JUL78/JUL80/		(ADD) E
404178	TEST PROTOSTASATMAAP	AUG80/	SEP80/	(ADD) E
404178	FINALIZE TDP	JUL80/	SEP80/	(ADD) E
404679	RECEIPT OF FUNDS	JUN79/JUN79/JUN79/JUN79		E
404679	PROJECT PREPARATION	JUN79/JUN79/JUL79/JUL79		E
404679	INITIAUTO/NALE EQUIPMENT CONCEPTS	JUL79/JUL79/AUG79/AUG79		E
404679	AUTOEQDIP MODELS/DEMO	AUG79/AUG79/SEP79/SEP79		E
404679	CONTRACT AWARD TO EQUIPMFGRS	AUG79/AUG79/JAN80/JAN80		E
404679	DESIGN REVIEW	FEB80/FEB80/FEB80/FEB80		E
404680	SHIM	FEB80/FEB80/MAR80/MAR80		E
404680	INST ALLEQUIP AT INATL SAAP	MAR80/MAR80/APR80/APR80		E
404680	DEVELOPMENT OF PROCEDURE	MAR80/MAR80/APR80/APR80		E
404680	DEBUG	APR80/APR80/MAY80/MAY80		E
404680	TESTS	MAY80/MAY80/SEP80/		E
404680	ACCEPTATION ESTAR	SEP80/	OCT80/	E
404680	PROJ PHYSICAL COMPLETION	OCT80/	OCT80/	E
404680	PROJ FISCAL COMPLETION	OCT80/	NOV80/	E
404680	FINANCIAL CLOSEOUT/FINALRPT	SEP80/	NOV80/	E
404680	FINALRPT301		DEC80/	(ADD) E
405074	PHASE 1 FEAS STUDY DESIGN	OCT73/OCT73/MAR74/MAR74		E
405074	AWARD CONTRACT	MAR74/MAR74/APR74/APR74		E
405074	FEASIBILITY STUDY	MAY74/SEP74/NOV74/MAY75		E
405074	PHASE 2 FLASH REINCE LOAD PROTOEQUIP	OCT74/DEC74/NOV74/MAY75		E
405075	AWARD CONTRACT FOR PROTOEQUIP FORDSGN TEST	FEB75/JAN76/MAY75/MAR76		E
405075	PROTOEQUIP FAB AT CONTRACTOR PLANT	MAY75/MAY76/MAR79/APR79		E
405075	DEL AVERY INSTALL & PROVE PROTOEQUIP AT LP	DEC79/	JUN80/	(DEL) E
405075	FINALIZE TECH DATA PKG	DEC79/	SEP80/	E
405075	MODIFY CONTRACT FOR PROTOCOMPLETION	MAY78/MAY78/JUL78/JUL78 (ADD)		E
405075	DEL PROTO TO INAAF	APR80/MAY80/MAY80/MAY80 (ADD)		E
405075	FINAL TECH RPT	JUN80/	SEP80/	(ADD) E
405075	FINAL 301 RPT		DEC80/	(ADD) E
405179	RECP TO FUNDING		OCT78/DEC78	E
405179	TECH REV + INDO SURVEY	JAN79/JAN79/SEP79/SEP79		E
405179	EVAL OF INSTRUMENTATION	SEP79/NOV79/NOV79/NOV79		E
405179	DOC + FINAL RPT	NOV79/NOV79/JAN80/JUN80		E
405179	PROJ PHYS COMPL	JUN80/JAN80		E
405179	PROJ FISC COMPL	JUL80/JAN80		E
405179	PROJ CLOSEOUT	AUG80/MAR80		E
405472	FEAS STUDY		APR72/APR72	E
405472	MOCK UP DSGN	APR72/APR72/APR72		E
405472	MOCK UP FAB	MAY72/JUN73/AUG72/JUN73		E
405472	DSGN TEST	APR72/JUN73/SEP72/JUN73		E
405472	LOAD PLATE TEST	SEP72/JUL73/OCT72/OCT73		E
405474	AWARD CONTR (PRINTSYS)	MAY74/MAY74/MAY74/MAY74		E

405474	PROTODSGN(PRINTSYS)	MAY74/MAY74SEP74/OCT74	E
405474	PROTOFAB(PRINTSYS)	JUN74/JUN74NOV74/FEB75	E
405474	DSGNTEST(PRINTSYS)	NOV74/OCT76DEC74/NOV76	E
405474	AWARDCONTR(DEFECTSYS)	JUL76/JUL76JUL76/JUL76	E
405474	PROTODSGN(DEFECTSYS)	AUG76/AUG76SEP76/SEP76	E
405474	PROTOTEST(DEFECTSYS)	JAN77/APR77FEB77/MAY77	E
405474	MERGEBOOTHSYS	FEB77/MAY77FEB77/MAY77	E
405474	OVERALLSYSTEST	MAR77/JUN77MAR77/SEP77	E
405474	TDPRELTOARRCOM		
405472	FEASTDY	OCT71/JAN72	E
405472	PROTODSGN	DEC71/SEPT2JAN72/SEPT4	E
405472	PROTOFAB	JUN72/JUL73SEP72/	E
405472	PROTODSGNTST	SEPT2/ OCT72/	E
405472	PROTOLOADPLANTTEST	OCT72/ NOV72/ (DEL)	E
405472	TDPRELTOARRCOM	JAN73/ JAN73/	E
405474	PROTOFAB	JAN75/JAN75	E
405474	PROTONUD	JAN78/MAY78AUG78/DEC78 (ADD)	E
405474	PROTODSGNTST	FEB73/MAR73NOV75/DEC78	E
405474	TDPRELTOARRCOM	JAN75/ JAN75/ (DEL)	E
405474	SHIPMACHTOARRADCOM	JUN79/MAR80JUN79/MAR80 (ADD)	E
126476	IBLASTENVIRAPPLTECH	JAN76/JAN76JUN76/JUN76	E
126476	2BLASTSUPPRESSION	JAN76/JAN76JUL76/JUL76	E
126476	3FRAENVIR	JAN76/JAN76DEC76/DEC76	E
126476	4FRAGSUPPRESSION	JAN76/JAN76DEC76/DEC76	E
126476	5ANALOGROUPSHTEDDATA	JAN76/JAN76OCT77/JAN78	E
126476	6STRUCTURALRESPONSE	JAN76/JAN76DEC76/DEC76	E
126476	7FINISHES(SUPPORTENGR)	JAN76/JAN76MAR76/MAR76	E
126476	2LINERS	JAN76/JAN76MAR77/MAR77	E
126476	3UTILITIES	JAN76/JAN76SEP76/DEC76	E
126476	4REHABILITATION+REPAIR	JAN76/JAN76SEP76/DEC76	E
126476	5ENVIRONMENTFACTORS	JAN76/JAN76SEP76/DEC76	E
126476	1PLANTSTUDY(OPFRAPPLS)	DEC76/DEC76OCT76/OCT76	E
126476	2ECONANL	MAR75/MAR75DEC76/DEC76	E
126476	3APPLANL	MAR75/MAR75SEP77/MAR77	E
126476	1PREPAREPLANSTHDBK	JUL76/JUL76JUL76/JUL76	E
126476	2PREPDRAFT	AUG76/SEP76MAY77/MAY77	E
126476	3REVIEWDRAFT	JUN77/AUG77JUL77/AUG77	E
126476	4SAFETYAPPVSURMISSION	SEP77/SEP77OCT77/OCT77	E
126477	1MODGROUP3SHIELD(TOPERAPPLS)	DEC76/DEC76JUN77/AUG77	E
126477	2DSGNGROUP1SHIFLD	DEC76/DEC76JUN77/SEP77	E
126477	1PROFTESTSGROUP5SHIELD(T SUPPORTENGR)	FEB77/FEB77JUN77/FEB78	E
400779	RECEIPTOFFFUNDS	JAN79/ JAN79/	E
400779	ENGINEERINGDESIGN	JAN79/ APR79/	E
400779	EQUIPPROCUREMENT	MAR79/ JUN79/	E
400779	SUPPMERATION	MAY79/ JUN79/	E
400779	EQUIPINSTALLATION	JUN79/ JUL79/	E
400779,8U	EQUIPOERATION	AU079/ FEB80/	E
400780	DATAEVALUATION	OCT79/ FEB80/	E
400780	ECOFICEVALUATION	JAN80/ FEB80/	E
400780	DESINREVIEW	FEB80/ APR80/	E
400780	PREPAREFINALENGINEERINGREPORT	FEB80/ APR80/	E
402477	CONDSTOY155MN483PROJ	OCT77/OCT77JUN79/	M
402479	PREPSCOPEOFWORK	AUG78/AUG78SEP78/MAR79	M
402479	RECEIVEFUNDS	OCT78/DEC78OCT78/DEC78	M
402479	AWARDCONT	APR79/APR79SEP79/SEP79	M
402479	BUILDMOCKUPS+PROVEOUT	FEB79/ APR79/ (DEL)	M
402479	MAKEDETAILEDWSGS+SPECS	SEP79/SEP79FEB80/	M
402479	REVIEWDWGS+SPECS	FEB80/ APR80/	M
402479	BUILDPHOTO+DERUGG	FEB80/ FEB81/	M
402479	ACCEPTOFPRT	FEB81/ JUN81/	M
402479	PREPTOP	MAY81/ AUG81/	M
402479	REVIEWTOP	AUG81/ SEP81/	M
402479	FINALTECHRPT	OCT81/ OCT81/	M
402479	FINAL301RTP	OCT81/ OCT81/	M
405979	SELOPARTICLESYSMONITOR	JUL79/JULY9AUG79/AUG79	E
405979	PROCUREMENT	AUG79/AUG79OCT79/NOV79	E

405979	HAZARDSANALYLSIS	JUL79/JUL79OCT79/APR80	E
405979	EQUIPHOD	SEP79/SEP79JUL80/	E
405979	INSTALLATION	DEC79/FEB80JUN80/	E
405979	OPER^EVAL	FEB80/FEB80OCT80/	E
405979	FINAL3UIRPT	NOV80/ DEC80/	E
405979	FISCALCOMPLETION	AUG80/ FEB81/	E
405979	PROJECTCLOSEOUT	FEB81/ MAR81/	E
406180	REVPROCPAR	MAY80/MAY80JUL80/	E
406180	REVNSE00ER	AUG80/ OCT80/	E
406180	PREPINTRIMTESTPLAN	MAY80/MAY80NOV80/	E
406180	PREFFINALTESTPLAN	NOV80/ FEB81/	E
406180	CONDUCTHAZARDSANALYSIS	AUG80/ MAY81/	E
406180	APPFFINALTESTPI AN	FEB81/ MAY81/	E
406279	PRCCREV	OCT78/OCT78MAR79/DEC79	E
406279-80	CONTRAWARDS	MAY80/MAY80OCT80/	E
406279-80	PROTODSGNCOMPL	OCT80/ JUN81/	E
406279	FINAL3UIRPT	JUL81/ AUG81/	E
406280	SITESEL	OCT80/ MAR81	E
406281-82	EXERCONTROPT	APR80/ JUN81/	E
406280	FINAL3UIRPT	SEP81/ OCT81/	E
406281	PROTOCOMPL	JUL81/ DEC81/	E
406281	VENDORTESTCOMPI	JAN81/ APR82/	E
406281	FINAL3UIRPT	MAY82/ JUN82/	E
406282	PROTOINSTALL	MAY82/ SEP82/	E
406282	PACTOACCEPT	OCT82/ JAN83/	E
406282	TDP	JAN83/ FEB83/	E
406280-82	HAZARDSANAL	OCT80/ FEB83/	E
406282	FINALRPT	JAN83/ MAY83/	E
406282	FINAL3UIRPT	JUN83/ JUL83/	E
406479	RECEIPIUFFFUNDS	OCT78/DEC78	E
406479	PREPARESCOPEOFWORK	OCT78/OCT78DEC78/DEC78	E
406479	PLACEC^TRACT	DEC78/JAN79MAR79/SEP79	E
406479	DESIGNSYSTEM	SEP79/OCT79NOV79/MAY80	E
406479	HAZARDSANALYSIS	SEP79/OCT79JUN80/	E
406479	SAFETYTESTSSTM	DEC79/FEB80AUG80/	E
406479	GFMFORUELOPHMNT	SEP79/SEP79SEP79/MAR80	E
406479	TDF+DOCUMENTATION	SEP79/SEP79SEP80/	E
406479	SOWFORPRODUCTIONLINE	JUN80/ SEP80/	E
406479	FINAL3UIRPT	(ADD)	E
408479	PROCQST	OCT78/OCT78DEC78/DEC78(ADD)	M
408479	CONTRACTAWARD	JAN79/JAN79JUN79/MAY79(ADD)	M
408479	SURVEY+SAMPLECOLLECTION	JUL79/JUL79SEP79/NOV79	M
408479	LAGEVAL+CORRELATION	OCT79/OCT79JUN80/ (DEL)	M
408479	ONSITECORRELATIONATGOCOPLANT	JUL80/ DEC80/ (DEL)	M
408479	FINALRPTDRAFT	JAN81/ MAY81/	M
408479	FINALRPTPUBLISHED	APR81/ JUN81/	M
410573	PREPCONCEPTOFWORKFEASENRSTUD/DEFS	OCT72/OCT72OCT73/OCT73	E
4105 74	PREPSCOPEOFWORK	JAN73/JAN74MAR73/MAR74	E
4105 74	ABARD^CONTRACT	APR73/APR73SEP73/APR74	E
4105 74	FEASISTUDYCOMPLETED	OCT73/JUN74MAR74/MAY74	E
4105 74	PREPARESCOPEOFWORKPHASE2	SEP73/SEP74OCT73/OCT75	E
4105 75	AWARD^CONTRACT	DEC74/FEB75FEB75/JUN75	E
4105 75	COMPLETEDSGNFA^PROVEOUTPHASE2	MAR75/JUN75OCT75/JUL76	E
4105 76	ABARDCONTRACTPHASE3	JUL75/JUL75DEC75/FEB76	E
4105 76	DSGNASSYINCRTPKOUTEQUIP	DEC75/FEB76MAR76/DEC76	E
4105 76	FAB+PROVEOUTINCRTASSYEQUP	APR76/APR76NOV76/FEB79	E
4105 77	INSTALL+PROVEOUTASSYINCRT	DEC76/MAY79MAR77/AUG79	E
4105 77	DEL+TESTINCRTLOAD+ASSYEQUP	JUN79/MAY79AUG79/AUG79(ADD)	E
4105 77	AWARD^CONTRACTPHASE4	JUL76/JAN77MAR76/JUN77	E
4105 77	DSGNINCRTPKOUTEQUIP	OCT76/JUN77DEC76/MAR79	E
4105 77	FAB+PROVEOUTINCRTPKOUTEQUIP	DEC77/APR78AUG80/	E
4105 77	INSTALL+PROVEOUTINCRTPKOUTEQUIP	JUN77/ SEP77/	E
4105 77	INSTALL+PROVEOUTINCRTW+INCRTLODGE	JUL77/ SEP77/ (DEL)	E
4105 77	DELIVER+TESTINCRTPKOUTEQUIPATLDPLANT	JUL80/ SEP80/ (ADD)	E
4105 77	FINALIZE^DTP	FEB79/FEB79FEB81/	E
410577	FINALPROJSTATRPT	FEB80/MAY80FEB80/JUN80(ADD)	E

411469	PROVNTLCOORDINATE+SUPPORT(TASK1)	JUL68/JUL68	E
411470,73	EVALINCINERATIONMETHODS/EQUIP(VERT)	FEB72/FFB72MAH73/MAR73	E
411470,71	ANALOFVENDORSEQUIP+PROCUREMENT(RAAP)	MAY70/MAY70JUN71/JUN71	E
411470	LITSEARCH+VENDCONTACT(REDWATERD1SP)	JAN70/JAN70JUN71/JUN71	E
411470	LAGEVAL	DEC70/DEC70JUL71/JUL71	E
411470,71	ID+QUANTOFPROP+ASTES	JUL70/JUL70DEC71/DEC71 (ADD)	E
411471	ASSEMTEAM+DEFEFFORTWKPLAN+SCHEDULES	OCT70/OCT70JUN71/MAY71	E
411471	INITINVEST+BACKGROUNDSTUDY	NOV70/NOV70SEP71/AUG71	E
411471	PRELIM+FIELDATAACQUISISSURVEYS	MAR71/MAR71NOV72/NOV72	E
411471THRU77	COCMU+SUPTACTFIRMLP OFABATEPROGS	OCT70/OCT70SEP79	E
411471	LITSURVEY(PA,RT)	DEC70/DEC70MAR71/MAR71	E
411471	SELTECHFORCONTRSTUDY	APR71/APR71JUN71/JUN71	E
411471	LABSTUUVIES	SEP71/FFB72JUN72/DEC72	E
411471	BENCHSCALEDENO	JUN72/ JUN73/ (DEL)	E
411471	PRCC+INSTALLOFPROTOEQUIP(RAAP)	DEC71/DEC71JUN72/MAY72	E
411471	EVALUPROTOEQUIP	FEB72/MAY72MAY72/DEC72	E
411471	FINALRPT	MAY72/ JUN72/ (DEL)	E
411471	INTERIMRPT	DEC72/JAN73APR73/APR73 (ADD)	E
411471	EMERSTUDY+REVTFWINCINERATORTECH(PA)	SEP70/SEP70JUN71/JUN71	E
411471	ACTPILOTSCALEI+CINERATOR(VER)	JAN71/JAN71SEP71/Sep71	E
411471	LITSEARCH(VAAP)	DEC70/DEC70JUN71/JUN71	E
411471	PURUF INSTRUFRONAL	DEC70/DEC70JUN71/APR71	E
411471	STUDYMTDFORSE+MEAS	SEPT0/SEPT0JUN71/JUN71	E
411471	ANALEXISTDATA+CLASSPOLLUTANTS	JAN71/JAN71JUN71/JUN71	E
411471-73	EVALCOMMERAVAIL EQUIP	JAN71/JAN71DEC72/DEC72	E
411471-73	INSTALL+EVALPPOTO	JAN71/JAN71MAR73/MAR73	E
411471-73	ISSUEINTERIMRPTS	JAN71/JAN71JUN73/JUN73	E
411471	FIELDSTUDYAMANOX+SO2MONITOR(MONITINS)	DEC71/DEC71JUN72/JUN72 (ADD)	E
411472	ARRDOCUMSELPLANTSURVEYRPTS	SEP71/SFP71OCT72/SEP72	E
411472,73	ANALPROG+ABATTECHS	APR72/MAY72JUL72/JUL73	E
411472,73	FINALRPT	AUG73/SEPT3SEP73/MAY74 (ADD)	E
411472,73	PERSMALLSCALEFIUIDBDEFEASSTUDY	APR72/APR72JUN73/JUN73	E
411472,73	INSTALL+EVALOFNCINERATORSYST	JUL71/JUL71DEC73/DEC73	E
411472,73,74	SAFETYHAZARDSTUDY+ASSOCOPEREVAL	JUL71/JUL71DEC73/DEC73	E
411472	PROGFUND	SEP71/SEPT1NOV71/NOV71	E
411472	EVALOFREVERSEOSMOSIS	SEP71/SEPT1MAY72/MAY72	E
411472	FINALRPT	MAY72/MAY72JUN72/JUN72	E
411472	CONTPROG(RMI)	MAR72/MAR72AUG72/AUG72	E
411472	PILUTSTDYTOEVAL MTHD	JUL71/JUN71DEC71/DEC71	E
411472	STATANALDATA	JAN72/JAN72JUN72/	E
411472,73	TREATMFTITROCFILLULOSEWASTES	SEP71/SEPT1JUN73/JUN73 (ADD)	E
411472,73,74	DEGRADATIONOFCHLLAGENWASTES	JUL72/JUL72FEB75/FEB75 (ADD)	E
411472,73	PREPUSGM:PAR+FINALRPT(RAAP)	JUN73/JUN73SEP73/DEC73	E
411472,73	HPTW/RECFORWATERRECY+CONTAMREC(INAAP)	NOV72/FEB73DEC72/MAR73	E
411472,73	ANALDATAW/INFO+USEOFWASTEWATER(BAAP)	OCT73/DEC73NOV73/FEB74	E
411472,73	FINALRPTFORWATERRECY/REUSE(HAAP)	SEP73/DEC73DEC73/MAR74	E
411472	TRENTOSPLINTS+UNEEES(INSTITUTECM)	JAN72/JAN72JUN73/JUN73 (ADD)	E
411472	LABSTUDYAMANOX+SO2MONITOR	DEC71/DEC71MAR73/MAR73 (ADD)	E
411472	EMMISCMARDFEXPI WASTE1NCR(FREEMAN)	NOV71/NOV71JUN72/JUN72 (ADD)	E
411472	SFTYCLTLUSGNOFFPLINCR(DUGWAYPG)	JAN73/JAN73JUN73/JUN73 (ADD)	E
411472	INTERIMRPTS	JUN72/JUN72MAY73/MAY73 (ADD)	E
411472	FISCOBLIG	SEP71/SEPT1SEP71/SEP71	E
411472	SURVEYSPLANNED(WATERSURVEYS)	SEP71/SEPT1DEC71/DEC71	E
411472,73	SURVEYSCOND	SEP71/SFP71JUN73/JUN73	E
411472,74	AEMARPTS	DEC71/DEC71JUN74/JUN74	E
411472,75	DATAEVAL	DEC71/DEC71SEP74/SEP74	E
411473,74	DATAGAPANALPOLIUTEMEMOFRTSELGOCPLANT	NOV72/NOV72DEC75/DEC75	E
411473	USENCRITERIA+SPEC(SHAAP)	JUL72/JUL72DEC72/JAN73	E
411473	SELCONTRACTOR+TSSUECONTRACT	OCT72/OCT72MAY73/APR73	E
411473	PILUTPCANTDSGN+FAH	MAY73/MAY73OCT73/NOV73	E
411473	PILOTPLANTINSTLL+TIE-IN	NOV73/DEC73DEC73/MAY74	E
411473	PILOTPLANTEVAL	JAN74/AUG74APR75/JAN78	E
411473	FINALRPT	JAN75/FFB78APR75/DEC79	E
411473THRU76	DSGNPRUCINSTAL EQUIP	APR73/APR73AUG78/ (DEL)	E
411473THRU76	DSGNPRUCINSTAL REVEQUIP	DEC77/DEC77JUN80/ (ADD)	E
411473	ENGHAPP	MAR73/MAR73JUL73/AUG73 (ADD)	E

411473	DSGN+INSTALLPILOTPLANT(TNTLINE)	APR73/APR73JUN74/	(DEL)	E
411473	DSGN+INSTALLEQUIP(VAAP)	MAR73/MAR73DEC73/JUL74		E
411473	INTERIMRPT-TOTINCINERATIONEFFORT	APR72/APR73SEP73/SEP73		E
411473,73,76	FLUUBEDUMODOFPTLOTSCALEINCINERATOR	APR73/APR73MAY76/MAY76		E
411473,73,76	ANAL+EVALOFFLUTDPILOTSCALEINCINERATOR	JUN76/JUN76JUL77/JUN77		E
411473,74,75	MERUCECOCOSTANAL	JAN74/JAN74OCT75/MAY78		E
411473	ANALSTUDY	SEPT72/SEP72NOV72/NOV72		E
411473	BENCH+INTERMEDSCALEDEMO	DEC72/DEC72JUL73/JAN74		E
411473	FINALRPT	AUG73/FEB73SEP73/MAY74		E
411473	PROGFUNU(RAAP)	NOV72/NOV72NOV72/AUG73		E
411473	BENCH-SCALETEST	DEC72/AUG73JUN73/APR74		E
411473	FINALRPT	JUN74/JUN74JUL74/AUG74		E
411473	PROCFUNOT(VAAP)	NOV72/NOV72NOV72/JAN73		E
411473	PHASEIILABSTUDIES	JAN73/JAN73MAY73/MAY73		E
411473	PHASEIIEXPERCONTRIBSTUDYFURNACEMOD	JUN73/JUN73SEP73/NOV73		E
411473	PILOTPPLANTTEST+EVAL	OCT73/DEC73NOV73/JAN74		E
411473	FINALRPT	NOV73/FEB74DEC73/MAR74		E
411473	OPTPILOTOPER+SFLPROTO	JUN72/ MAR73/ (DEL)	(DEL)	E
411473,74	ON-LINEDE MO	APR73/ DEC74/ (DEL)	(DEL)	E
411473	BENCHSCALFSTUDIES(REEUSESCRAPPROP)	JUN73/JUN73JAN74/JAN74		E
411473	LABSTUDY(BAAP)	JUN73/JUN73AUG73/AUG73		E
411473	PRELIMRPT	AUG73/SEP73SEP73/NOV73		E
411473	DETSPECOURCES/BENZENE+ETHYLACE(BAP)	JUL73/JUL73MAY74/MAY74		E
411473	PROCBENCHSCALEFQUIP	NOV73/NOV73MAY74/MAY74		E
411473	EVALZOUTP	FEB74/FEB74JUL74/JUL74		E
411473	EVALPOVTHDOFEIIMSOLVENTS	JUN74/JUN74OCT74/OCT74		E
411473	FINALRPT	SEPT74/SEP74JUN75/JUN75		E
411473	INTERIMRPTFORE+PROGSTUDYATHAAP	MAY73/MAY73JAN74/JAN74		E
411473	IDENTOFSPLINSTPNEEDS	JUL73/JUL73JUN74/JUN74 (ADD)		E
411473	DEVOPENGRYCSLUORRYMONITOR(OPTICPROBE)	DEC72/DEC72JUL73/JUL73 (ADD)		E
411473	OPTICPROBELAB+ILOTSCALE	DEC72/DEC72DEC73/DEC73 (ADD)		E
411473	EVALOFANBAIRMO+ITOR	AUG72/AUG72JUL73/JUL73 (ADD)		E
411473	EVALOFNOXSOURCEMONITORS	SEPT72/SEPT72AUG73/AUG73 (ADD)		E
411473	EVALOFWATERMONITORSYS TS	JUN73/JUN73MAY74/MAY74 (ADD)		E
411473	DEVPOLAROGRAPHCTYPEHDN1TOR(NITRO)	SEPT72/SEPT72JAN74/JAN74 (ADD)		E
411473	FEASSTUDYFORRAMANSPECTRO(TETRANITRO)	JUN73/JUN73SEP73/SEP73 (ADD)		E
411473	FEASSTUDYFORCOLORIMETRY	JUN73/MAY73SEP73/DEC73 (ADD)		E
411473	DEVPIEZOSELECTYPEMONITOR	SEPT72/SEPT72SEP74/SEP74 (ADD)		E
411473	DEVINFRAKEDTYPEPMONIT(METHYLNITRATE)	FEB73/FEB73JAN74/JAN74 (ADD)		E
411473	EVALOFINKWATEFMONITOR	APR73/APR73DEC73/DEC73 (ADD)		E
411473	INTERIMRPTS	JUN73/JUN73MAY74/MAY74 (ADD)		E
411473	BKGHDACQUIS	JUL72/JUL72JUN73/JUN73		E
411473	PRELIMDSG+FORTRANITTESTSYST	APR73/ SEP73		E
411473,74	HENLMSCALETEST+PROMISAPPROACHES	JUL73/MAR73JUN74/		E
411473	SURVEYSPANNER(AIRSURVEY)	SEP72/MAY72DEC72/DEC72		E
411473,74	SURVEYCOND	NOV72/NOV72JUN74/JUN74		E
411473,74	FEASSTUDYDYNOSPESS(WATERBASELUBEST)	MAY73/MAY73JUL73/JUL73		E
411473	ACGPERS	DEC72/DEC72JUN73/JUN73		E
411473	PROCEQUIP	DEC72/DEC72JUN73/JUN73		E
411473	ENVIRASSESS	DEC72/JAN73MAY73/JUN73		E
411473	QUARTERLYSURVEY	JAN73/JAN73JAN73/APR73		E
411473	ANNUALPROGRT	JUN73/JUN73JUN74/DEC74		E
411473,75	POLLUTEREMOFRPFMPPLANTS+FINALENGRRPT	SEPT74/SEP74DEC76/DEC76		E
411474	OPEN+EVALEQUIP	DEC73/AUG74MAR74/JAN75		E
411474	INTERIMRPT	MAR74/APR75MAY75/MAY75		E
411474	FINALRPT	JAN74/JAN74APR74/FEB75		E
411474,75	HYBRIDEMISSIONSTUDIES	NOV75/ FEB77/		E
411474	EQUIPMUD(VAAP)	MAY74/MAY74JUL74/JUL74		E
411474	FURNACEEVALTESTS	JUL74/JUL74AUG74/AUG74		E
411474	FINALRPT	SEP74/OCT74OCT74/NOV74		E
411474	PILOTPPLANTTESTPLANT(RAAP,MERUC)	FEB74/FEB74APR74/MAR74		E
411474,75	PILOTPPLANTINSTALL+EVAL	APR74/APR74OCT75/OCT75		E
411474	PILOTPPLANTINSTALL+EVAL	SEP73/SEP73OCT75/OCT75		E
411474	EQUIPPHOC(PHASIFI)	SEP73/SEP73OCT73/OCT73		E
411474	EQUIPDTEL	OCT73/OCT73NOV73/NOV73		E
411474	EQUIPEVAL	NOV73/NOV73JUN74/JUN74		E

411474	FINALRPT	MAR74/MAR74OCT74/OCT74	E
411474,75,76	ACIDWATERRECYCFTNALRPTUSGN(RAAP)	JUN76/OCT76NOV76/NOV76	E
411476	FINALRPTWATERUTILSTUDY(HAAP=INTERLN)	AUG74/AUG74DEC74/DEC74	E
411476	EVALPILOTPLANT(MODAC20MFG)	SEP74/FEB75APR76/MAY76	E
411476	FINALRPT	APR76/APR76JUN76/JUN76	E
411474	ECOANALOFRECY+REUSEFORHAAPA+BPROC	JAN74/JAN74JAN75/JAN75	E
411474	IDENTOF SPLINSTRAUMECS	JUL74/JUL74JUN75/JUN75(ADD)	E
411474	RPT	AUG73/AUG73OCT73/OCT73(ADD)	E
411474	DEVOLTHAVIULETTYPEMONITOR(MONONITRO)	FEB73/FEB73JAN74/JAN74(ADD)	E
411474	RPT	JAN74/JAN74JUN75/JUN75(ADD)	E
411474	OPTICPROBELAB+PILOTSCALE	JAN74/JAN74DEC74/DEC74(ADD)	E
411474	OPTICPROBELAB+PILOTSCALE	JAN75/JAN75DEC75/NOV75(ADD)	E
411474	EVALOFNOXSOURCEMONITORS	SEP73/SEPT3AUG74/AUG74(ADD)	E
411474	RPT	FEB74/FEB74MAY74/MAY74(ADD)	E
411474	EVALPOLAROGRAPHICTYPEMONITOR	FEB74/FEB74JUL74/AUG76(ADD)	E
411474	RPT	OCT73/OCT73JAN74/JAN74(ADD)	E
411474	RPT	OCT73/JAN74MAR74/MAR74(ADD)	E
411474	RPT	JUL74/JUL74OCT74/OCT74(ADD)	E
411474	RPT	JAN74/JAN74JUN75/JAN75(ADD)	E
411474	EVALINFRAREDTYPEMONIT	FEB73/FEB74JUN75/JUN75(ADD)	E
411474	DEVOFRAMANTYPEMONITOR(TDX/MMX)	DEC73/DEC73JUN77/JUN77(ADD)	E
411474	EVALOFWATERMONITORSYS(EVALMONITINS)	JUN74/JUN74FEB75/FEB75(ADD)	E
411474	INTERIMRPTS	JUN74/JUN74MAY75/MAY75(ADD)	E
411474	CNTLSYSTDSGN(CNTFGFORNITROCELLULOSE)	JUL73/JUL73DEC73/DEC73(ADD)	E
411474	INSTALLECNLYST	JUN74/MAY74DEC74/NOV74(ADD)	E
411474	INSTALLCNLYST	JUL74/MAY74SEP74/SEP74(ADD)	E
411474	INITTESTUNDERPLANTCONDITIONS	OCT73/ SEP74/	E
411474	PILOTFACDSGN	JUN74/ DEC74/	E
411474,75	EVALOPRESULTS+RPT	NOV74/NOV74APR75/APR75(ADD)	E
411474	RESURVEYPLANNED	APR74/APR74OCT74/OCT74	E
411474,75	REMARKS	OCT73/OCT73DEC74/DEC74	--E
411474	DATAEVAL	DEC73/DEC73MAR74/MAR74	E
411474,75,76	COGRW/MOD+EXPPROGS	DEC73/DEC73SEP77/SEP77	E
411474	FEASSTUDYCABBAGE+PIERCE	MAR74/MAR74MAY74/MAY74	E
411474	FUNUSHRECVD	JUL73/SEPT3JUL73/SEPT3	E
411474	FISCALÖBLIG	JUL73/SEPT3JUL73/SEPT3	E
411474	LITSEARCH	JUL73/JUL73SEP73/SEP73	E
411474	AUTOEQUIPSTUDYFORWATERANAL(WATENINST)	OCT73/OCT73FEB74/FEB74	E
411474	PUROFWATERANALEQUIP	FEB74/FEB74JUN74/JUN74	E
411474	AUTOEQUIPSTUDYFORAIRANAL(AIRINSTRU)	APR74/APR74AUG74/AUG74	E
411474	ANNUALPROGRPT	JUN74/JUN74JUL74/JUL74	E
411475	BENCHSCALE SUPPORT STUDIES(RAAP)	APR76/APR76AUG76/NOV77	E
411475	PROCEVR+PILOTPLANTSEL	OCT74/OCT74MAY75/MAY75	E
411475	PROGUND(VAAP)	MAY75/MAY75JUN75/JUN75	E
411475	IDENTOFSMELTIMPURITIES(B+W)	SEP75/NOV75DEC75/DEC75	E
411475	EVALOFREMVALTECH(B+W)	DEC75/JUN76DEC76/DEC76	E
411475	SSRP(VAAP)	FEB77/FEB77JUN77/JUN77	E
411475	ASSESS+RPT	NOV77/NOV77MAR78/APR78	E
411475	AIRRECOVERYSTUDIES	JAN78/JAN78MAR78/MAR78	E
411475,76	SSRP(VAAP,RAAP)	SEP77/NOV77OCT79/OCT79	E
411475	RPT	MAR74/MAR74JAN77/JAN77	E
411475	DEFPROGPLANS+ORJ(HAAP)	JUN76/JUN76SEP76/SEP76	E
411475	BENCHSCALEEVAL	SEP76/SEP76FEB77/FEB77	E
411475	EQUIPEVAL	DEC76/DEC76APR77/APR77	E
411475	PILOTPLANTDSGN	APR77/APR77JUN77/JUL77(ADD)	E
411475,76	PILOTPLANTINSTALL+EVAL	OCT77/NOV77DEC79/ (ADD)	E
411475	DEVTECMFORREC+RECYCLOFETHACE+NITRO(P)I	MAR75/MAR75MAY75/JUL75	E
411475	BENCHSCALEEVALOFBESTMTHD+EQUIP	MAR75/MAR75MAY75/JUL75	E
411475	FINALRPT	FEB76/FEB76OCT76/OCT76	E
411475	ORD_EQUIP+CMPLD+TADSGNPILOT(VAAP-SAR)	FEB75/FEB75JUN75/ (DEL)	E
411475	CONST+EVALOFPILOTEQUIP	JUL75/ NOV75/ (DEL)	E
411475	FINALRPT	NOV75/ DEC75/ (DEL)	E
411475	VAAPESEGCOOL+PPRCRECECUANALPINRPT(EWA)	JUN75/JUN75DEC76/MAR77(ADD)	E
411475	IAAPMAAPLAPOPERPI+IIFINALRPTS	APR75/APR75JAN77/FEB77(ADD)	E
411475	BENCHSCALEVALPHIIIFINALRPT	APR75/APR75MAY76/MAY77(ADD)	E
411475	IAAPBLÄCKPOWDRMFGPHIIIFINALRPT	APR75/APR75JAN77/FEB77(ADD)	E

411475,76	MAAPPYHO+MISSILECASEPHOPPHI+IIFINRPT	FE875/	JUN75/	(DEL) E
411475,76	JAAPSELLITEMFGPHI+IIFINALRPT	APR75/	AUG75/	(DEL) E
411475,76	JAAPMFQGDFNT+FTTRYLPHI+IIFINALRPT	JUN75/	NOV75/	(DEL) E
411475,76	HAAPSEGCQOL+PROGWATERSURFINALRPT	AUG75/	JAN76/	(DEL) E
411475,76	SFELWATCH+GTTA+KASASSGN	FE875/	FE875/SEP77/SEPT7	E
411475	USGN(N)THOCNTLCYST)	MAR75/MAR75JUN75/MAR76(ADD)	E	
411475	PFC+INSTALL	AUG75/JAN76SEP76/AUG77(ADD)	E	
411475	EVAL	SEP77/SEP77MAY79/MAY79(ADD)	E	
411475	RPT	JAN78/JUN79MAY78/DEC79(ADD)	E	
411475	USCN(TETHANITROMETHANE_CNTL(SYST)	JUL75/JUL75JAN76/JAN76(ADD)	E	
411475	PRC+INSTALL	FE876/FEB76DEC76/MAR77(ADD)	E	
411475	RPT	JAN77/JAN77APR77/JUL77(ADD)	E	
411475	LITSEARCH(NOXCNTLSYST)	MAY75/MAY75JUL75/JUL75(ADD)	E	
411475	USGN	SEP75/SEP75DEC75/APR78(ADD)	E	
411475	PRC	JAN76/JAN76DEC77/APR78(ADD)	E	
411475	INSTALL	JAN78/JAN78JAN80/	(ADD) E	
411475	HAZARDS+VAL+ONLINEVAL	MAY80/	JUL80/	(ADD) E
411475	RPT	AUG80/	OCT80/	(ADD) E
411475	IDENTOFSPINST+UNEEDS	JUL75/JUL75OCT77/	(DEL) E	
411475	EVALUFULTRAVIOLETTYPEMONITOR	FE874/FEB74JUN75/JUN75(ADD)	E	
411475	EVALOFAIRMONITOR	AUG74/AUG74JUN75/JUN75(ADD)	E	
411475	EVALUFNOXSOURCEMONITORHS	SEP74/SEP74NOV75/MAY76(ADD)	E	
411475	RPT	AUG76/AUG76NOV76/OCT76(ADD)	E	
411475	E ² TPLAROGRAPHICPRINCIPLE	NOV75/NOV75DEC76/DEC76(ADD)	E	
411475	EVALOFPIEZUELFCTTYPEMONITOR	OCT74/OCT74APR77/APR77(ADD)	E	
411475	RPT	JUL75/NOV77OCT75/DEC77(ADD)	E	
411475	RPT	MAY75/MAY75AUG75/AUG75(ADD)	E	
411475	EVALUFHANTYPEMONITOR	JUL77/	SEP77/	(DEL) E
411475	RPT	OCT77/	MAR78/	(DEL) E
411475	EVALOFWATERMONITORSYS	APR78/	JUN78/	(DEL) E
411475	EVALUFPACIDOMSTMONITOR	MAR75/MAR75DEC75/MAY76(ADD)	E	
411475	I ² TEHIMRPTS	MAR75/MAR75DEC75/APR76(ADD)	E	
411475	EVALUNILCYST	JUN75/JUN75DEC75/DEC75(ADD)	E	
411475	RPT	DEC74/DEC74JUL75/JUL75(ADD)	E	
411475	USGNSLURKYCNTLCYST(EXPL+PRUPWASTEINC)	AUG75/AUG75OCT75/OCT75(ADD)	E	
411475	FVALSLURYHCNTLCYST	SEP74/SEP74OCT74/DEC74(ADD)	E	
411475	RPT	JUL75/JUL75DEC75/NOV75(ADD)	E	
411475	EVALCNTLCYST	JAN76/JAN76APR76/APR76(ADD)	E	
411475	ECLIPPNIC	OCT74/OCT74JUN75/JUN75(ADD)	E	
411475	PREOPFILMPLANT+BLDG	JAN75/	JUN75/	E
411475,76	PILOTACTEST+FVAL	JUL75/	JUN76/	(DEL) E
411475	RAPHSURVEY	JUL75/	MAR76/	E
411475	AUTOADAPTOWATERPANALEQUIP	SEP74/SEP74OCT74/OCT74	E	
411475	PURCFAIRNALFOUIP	JUN74/JUN74FEB75/FEB75	E	
411475,76	AUTOADAPTOWFAIRPANALEQUIP	AUG74/AUG74DEC74/FEB75	E	
411475	FIELDSSURVEY(PRA)	DEC74/MAR75OCT75/JAN76	E	
411475	ANNUALPROGRT	SEP74/JUN75JUN75/	E	
411475	CTRNEG+AWARD	JUN75/MAY75JUL75/JUN75	E	
411475	REVUATAFHPOLSURVEY	JAN75/JAN75MAR75/DEC75	E	
411475	SELTECHFORSTORY+PLANPROG	MAR75/MAR75APR75/APR75	E	
411476	SULFUHICACIDSCUBEVAL	MAY75/MAY75JUN75/JUN75	E	
411476	NTRICACIOSCOPEVAL	AUG78/	FE879/	(DEL) E
411476	EVALUFKEVPROC	FE879/	AUG79/	(DEL) E
411476	FINALRPT	MAY80/	FE880/	(ADD) F
411476,77	INTERIMPTONFLUIDBEDPILOTSCALEINC	MAR80/	JUN80/	E
411476,77	FINALRPT	MAY76/MAY76MAR77/	(DEL) E	
411476	RPT+TOP	JAN77/JAN77JUN77/JUN78	E	
411476	EVALUFTERTIARYTREAT	JUN75/AUG75JUL76/AUG76	E	
411476	FINALRPT	MAR76/MAR76MAR77/APR77	F	
411476	PILOTPLANTDSGN+INSTALL(PII)	DEC79/	APR80/	(ADD) E
411476	PILOTPLANTEVAL	FE876/FEB76OCT76/OCT76	E	
411476	PICTOSYSTDSGN+INSTALL	SEP76/SEP76MAR76/JUN76	E	
411476	FINALRPT	OCT76/OCT76JUL77/	E	
411476	KEV+PUBOFFINALOPT	JUN77/JUN77APR79/APR79	E	
411476	RECYRPSA4PFRRMAP(ARRADCOM)	MAY79/MAY79JUL79/SEP79	E	
		AUG76/AUG76AUU76/AUG76	E	

411476	PERFSHT-TERMSTOR/STABTESTS	SEP76/SEP76JAN77/FEB77	E
411476	PERLONG-TERMSTOR/STABTESTS	SEP76/SEP76SEP77/SEP77	E
411476	PREPCINALAPT	SEP77/SEP77AUG78/AUG78	E
411476,77	INFL+EFFLWATERQUALQUANT(CSL/ARRADCOM)	OCT77/OCT77JAN78/JAN78	E
411476,77	EVALDATA	FEB78/FEB78MAY78/MAY78	E
411476,77	FINALRPTRECORRECTY/REUSE	JUN78/JUN78JUL79/AUG79	E
411476,77	FINALRPTRECORRECTY/REUSE(DSN)	JUN78/JUN78JUL78/AUG78	E
411476,77	FINALRPTHECORRECTY/REUSE (NGU)	JUN78/JUN78OCT78/AUG79	E
411476	RPT	JAN77/JAN77SEP77/SEP77(ADD)	E
411476	EVALOFWATERMONITORSYS	JUN76/JUN76JUL77/JUL77(ADD)	E
411476	EVALOF SULFIDE MONITOR	MAR76/MAR76JAN80/ (ADD)	E
411476	EVALOF TOT CARBON MONITOR	MAR76/MAR76JAN80/ (ADD)	E
411476	EVALOF NITROMONITOR(AIR)	JAN76/JAN76MAR80/ (ADD)	E
411476	EVALOF HYDROCARRONMONITOR	JUN76/JUN76DEC76/JUN78(ADD)	E
411476	INTERIMRPTS	JAN78/JAN78JUL77/JUL77(ADD)	E
411476	FINALRPT	APR76/ MAY76/	E
411476	ASSYOPPILOT+EQUIPBLDG	JAN76/ APR76/ (DEL)	E
411476	IDENT+EVALOF TNT COMPOST PROD	MAR76/ NOV76/ (DEL)	E
411476	INSTALL COMPOST EQUIP(PHASEI)	MAY77/MAY77JUN77/JUL77(ADD)	E
411476	ESTABACT COMPOST	MAR78/MAR78JUL78/AUG78(ADD)	E
411476	ANAL SAMPLES	JUL78/NOV78SEP78/FEB79(ADD)	E
411476	REPEAT COMPOST	MAR79/MAR79APR79/APR79(ADD)	E
411476	REPEAT ANAL	APR79/APR79JUN79/JUN79(ADD)	E
411476	FINALRPT	JUN79/JUN79SEP79/SEP79	E
411476	TOXICITY STUDIES PHASE II	MAY79/MAY79APR80/	E
411476	LCAAPRESURVEY	JUL75/JUL75AUG75/AUG75	E
411476	ONSITE INSTALL+TESTEQUIWPWATER	FEB75/JUL75APR77/APR77	E
411476	FINALRPTWATER	APR77/APR77MAY77/JUL77	E
411476	ONSITE INSTALL+TESTEQUIP-AIR	OCT75/JUL75MAR79/MAR79	E
411476	FINALRPT-AIR	MAR79/MAR79APR79/MAY79	E
411476	FINALRPT-PROG	APR79/MAY79MAY79/MAY79	E
411476	SAAP(FIELDSURVEY)	AUG75/AUG75SEP75/SEP75	E
411476	PBA	OCT75/OCT75NOV75/NOV75	E
411476	PBA	MAY76/MAY76MAY76/MAY76	E
411476	SAAP-PES	MAR75/MAR75AUG75/MAR76	E
411476	RAAP-PES	AUG74/SEP74SEP75/JAN76	E
411476	PBA-SUNOPTIC	JUL75/AUG75MAR76/APR76	E
411476	PBA-P4	JAN76/JAN76NOV76/MAR77	E
411476	SAAP-BENTHOS	JAN76/JAN76OCT76/AUG77	E
411476	HAAP-PES	MAR76/JAN76DEC76/JUL77	E
411476	VAAP-PES	MAR76/JAN76DEC76/AUG77	E
411476	RMA-BIUL	JAN76/JAN76SEP76/JUL77	E
411476	DPC-BIOL	JAN76/JAN76SEP76/AUG77	E
411476	PRO-EQUIPCONS+INSTALL	DEC75/DEC75AUG76/DEC76	E
411476	DEVENGHDATA	MAY75/MAY75SEP75/SEP75	E
411476	PRELIMSTDY+EVALSELTECH	DEC75/DEC75JAN76/JAN76	E
411476	PILOTSTUDY	FEB76/MAR76MAY77/DEC77	E
411477	FINALTASKRPT	JAN80/ MAR80/ (ADD)	E
411477	ANAL FOR WAX CONTR PRIORITY FILTER KAFT	MAY77/MAY77JUL77/JUL77	E
411477	WATERBALVS PROC+PROD	MAY77/MAY77NOV77/NOV77	E
411477	COLDSTEAMCONDFRMLT KETTLE+ANAL	AUG77/AUG77AUG77/AUG77(ADD)	E
411477	PROP MAX REMM THD PRIORITY FILTER STEP	AUG77/AUG77OCT78/OCT78	E
411477	DEFSTEAMCOND+REFCREUSE	NOV77/ JAN78/	E
411477	FINALRPT	OCT78/OCT78DEC78/DEC78	E
411477	EVAL REUSE OF STEAMCOND	JUL78/JUL78AUG78/AUG78(ADD)	E
411477	EVAL REUSE OF TREATED WATER	JUL78/JUL78OCT78/OCT78(ADD)	E
411477	CAL WATER BAL VS WATER QUAL REL TO USE (IOAP)	MAY77/MAY77JUL77/JUL77	E
411477	IDENT RCTY/REUSFMEAS	JUL77/JUL77SEP77/SEP77	E
411477	FINALRPTDWGSHRECOM	OCT77/OCT77NOV77/MAY78	E
411477	COMP+VAL PILOT PLANT THUS FOR NITROREM	APR77/APR77JUN78/JUN78	E
411477	PERSONAL ALONE STAB+PROPMTDS	JUN77/JUN77JUN78/FE879	E
411477	FINALRPT	JUN78/SEP78JUL79/AUG79	E
411477	SAAPRESURVEY	OCT76/OCT76NOV76/FE876	E
411477	AIRPERMIT(MAAP)	FEB78/FEB78SEP78/SEP78	E
411477	WATERPERMIT	APR78/APR78APR79/OCT78	E
411477	SOLIDWASTE PERMIT	JUN78/JUN78JUN79/JUN79	E

411477	PBA (FIELD SURVEY)	MAR77/APR77/APR77/MAY77	E
411477	PBA - PROJ UAREACREEK (SURVEYRPTS)	SEP77/NOV77/JAN78/JAN78	E
411477	PHASEIIPROGRPT	NOV76/DEC76/SEPT77/NOV77	E
411477	EXPCAPTESTEFFLUENTS	JUL77/OCT77/DEC77/DEC77	E
411477	REVDATA+DEVPRNG	JAN77/JUL77/MAR77/DEC77	E
411477	IMPLPROG	SEP77/AUG78/DEC79/	E
411478	FINALRPT	JUN79/	E
411478	TOAU (FIELD SURVFY)	MAY78/MAY78/JUN78/JUN78	E
411478	ABD	MAY78/HAY78/AUG78/AUG78	E
411478	TOAD (SURVEYRPTS)	JUL78/JUL78/DEC78/DEC78	E
411478	KAP	SEP78/SEP78/DEC78/DEC78	E
411478	PHASEIIIPROGRPT	JAN78/JAN78/FEB78/MAR78	E
411478	SHAKEDOWN, ONLY IN TEST PHASE III	MAR78/MAY78/FEB79/FEB79	E
411478	PHASEIII	NOV78/NOV78/FEB79/FEB79	E
412479	MASTERPLANREVITFW	DEC79/FEB80/DEC79/FEB80	M
412479	PROCESSMACHENG+STUDIES	FEB80/DEC79/JUL80/	M
412479	PRELIMCYCLESTUNIES	APR80/APR80/AUG80/	M
412479	FINALPROCESS	MAR80/APR80/	M
412479	TOOL+FIXTURESFCS	JUN80/SEP80/	M
412479	PROGRAMMING	SEP80/NOV80/	M
412479	FINALPRGDESIGN	OCT80/SEP80/	M
412479	TOOL+FIXTUREPUPCHASE(BUILD)	NOV80/MAY81/	M
412479	INSTALL+TRAYOUT	JUN81/JUL81/	M
412479	RUNOFF(200)PCSTOTAL(5+8)	SEP80/SEP80/	M
412479	FINALIZEDATAPKG	JUN81/JUN81/	M
412479	SUBMITFINALREPTDATAPKG+TOOLS+FIXTURES	OCT80/OCT80/	M
412479	SUPERPROCOPT	MAY80/SEP80/	M
412479	RUNOFF10OPCS	JUN81/JUL81/	M
412479	FINALRPT	JUL81/SEP81/	M
413779	RELEASEPROGRAM+AUTHORIZATION	OCT78/DEC78/OCT78/DEC78	E
413779	REVIEW+ESTABLISHDSGNPARAMETERS	NOV78/DEC78/NOV78/JAN79	E
413779	PREPARESCOPEOFWORKTODETERMINEFEAS	NOV78/JAN79/MAR79/MAR79	E
413779	AWARDFEASCONTRACT	APR79/APR79/JUN79/ (DEL)	E
413779	FEASSTUDY	OCT79/OCT79/JUN80/	E
413779	SELCONCEPTSTORFDEV	OCT79/OCT79/DEC79/FEB80 (ADD)	E
413779	DEVCONCEPTS	DEC79/FEB80/JAN80/MAR80 (ADD)	E
413779	PRELIMANALYSIS	JAN80/MAR80/MAR80/MAY80 (ADD)	E
413779	FINALENGREVAL	JUN80/ (ADD)	E
413779	FINALTECHRPT	JUN80/SEP80/ (ADD)	E
413779	FINAL301HPT	DEC80/ (ADD)	E
414770	PROJAPPVL	N/A OCT77/OCT77	E
414770	PREMOFRQ	DEC78/DEC78/JAN71/JAN71	E
414770	EVALOFTECHPROP+SEL	MAR71/MAR71/APR71/APR71	E
414770	PLACECONTRACT	N/A JUL71/JUL71	E
414770	DETDSGNCNLYSYST	(DEL)	E
414770	DSGN+SPECREV	JUL71/JUL71/MAR72/MAR72	E
414770	EQUIPDSGN+FAB	OCT71/OCT71/JUL72/JUL72 (ADD)	E
414770	FLOWCHART+DET SOFTWARE+DSGN+CODING	OCT71/OCT71/NOV72/JAN73 (ADD)	E
414770	INSTALLFIELD EQUIP	AUG72/AUG72/NOV72/JUN73	E
414770	FACTTESTCOMPHDWR+SOFTWARE	JUL72/AUG72/NOV72/JUN73	E
414770	SHPMTCOMP TOVAAP	DEC72/JUL73/DEC72/JUL73	E
414770	INSTALLCOMPINCTLHOUSE	JAN73/JUL73/MAR73/AUG73	E
414770	CNTL SYSTEM SITE CHECKOUT EVAL	FEB73/AUG73/SEPT73/NOV78	E
414770	FINALPROJRPT	SEP73/FEB75/OCT73/JUN79	E
414774	VAPP+INSECTS/NY+SUPCNTLSFTWRIMPLE	JUN74/AUG74/ (DEL)	E
414774	SUPCNTLSFTWRIMPLE	JAN74/JUN74/ (DEL)	E
414774	PREPRAAPSYS+SPFC	JAN74/MAY74/APR75/MAR76 (DEL)	E
414774	EVALOFPROP+VENSEL	JUL74/JUN75/AUG74/ (DEL)	E
414774	PREP+ISSINVFORIDONANALOGSYST	APR76/APR76/JUN76/AUG76 (ADD)	E
414774	EVALBIUS+VENDSELFORANALOGSYST	OCT76/OCT76/NOV76/JAN77 (ADD)	E
414774	CNTLREQ+AARD	FEB77/FEB77/APR77/JUL77 (ADD)	E
414774	MDRDSGN+FAB	SEP74/AUG77/OCT75/NOV78	E
414774	SOFTWAREDSGN+PROG	SEP74/OCT75/ (DEL)	E
414774	INSTALLANALOGQUIP+PRESTARTUPCHECKOUT	JUL75/AUG79/OCT75/MAY80	E
414774	OPER+EVALOFLCLM+UNDERCATLOFA ANALOGSYNOV75/	JAN76/ (DEL)	E
414774	PRESHPMTCHECKOUTOFDIGITALSYST	AUG75/NOV75/ (DEL)	E

414774	SHMPTOFGSYSTT0RAAP	DEC75/	DEC75/	(DEL) E
414774	INSTALLDIGEQUIP+CHKOUTOFINTEGSYST	JAN76/	FEB76/	(DEL) E
414774	DOACSYSTPEREVAL	MAR76/	MAY76/	(DEL) E
414774	SUP SOFTWARE IMPL	JUN74/	JUN74/	(DEL) E
414774	PREPPFINALRPT	JAN76/	JUN76/	(DEL) E
414774	PRE-START-UP CHECK-OUT	APR80/APR80AUG80/	(ADD) E	
414774	FINALTECHRPT	AUG80/	NOV80/	(ADD) E
414774	FY74FISCALFINAL301RPT	DEC80/	DEC80/	(ADD) E
414774	OVERALLPROJFINAL301RPT	DEC80/	DEC80/	(ADD) E
415378	RECEIPTOFFFUNDS	MAY78/MAY78MAY78/MAY78	M	
415378	AWARDOPCONTRACT	JUL78/MAY78SEP78/FEB79	M	
415378	CORRULTRASONICDATA	OCT78/MAR79JAN79/AUG79	M	
415378	ESTABPR0D	JUN79/	AUG79/	M
415378	CLEANPROC	AUG79/AUG79JAN80/	M	
415378	BAND15MMH483PROJ	JUL80/	JUL80/	M
415378	BAND8INXMS09PROJ	AU80/	SEP80/	M
415378	BALLISTICSEVAL	MAR80/MAY80SEP80/	M	
415378	FINALRPT	SEP80/	NOV80/	M
415378	FINALRPT301	OCT80/	OCT80/	M
416378	ENGRREVIEW+ANALYSIS	APR78/APR78OCT78/OCT78	E	
416378	PREPARESCOPEOFWORK	MAR78/MAR78MAR78/MAR78	E	
416378	REVIEWSCOPEOFWORK(IAAP)	APR78/APR78APR78/APR78	E	
416378	DESIGNTESTPLAN	APR78/APR78APR78/APR78	E	
416378	APPROVESCOPEOFWORK+TESTPLAN	APR78/APR78APR78/APR78	E	
416378	ALLOCATIONOFFUNDS	MAY78/MAY78MAY78/MAY78	E	
416378	DSGN+FABEQUIP	JUN78/JUL78AUG78/AUG78	E	
416378	EXECUTIONOFTESTPLAN	AU078/SEP78JAN79/FEB79	E	
416378	REVIEWOFTESTRESULTS	SEP78/SEP78JAN79/FEB79	E	
416378	PROCESS+EQUIPDSGNS	SEP78/SEP78APR79/APR79	E	
416378	STUDYREPORT	NOV78/NOV78MAY79/MAY79	E	
416379	ESTABENGRAPPROACH	NOV78/MAR79NOV78/MAR79	E	
416379	DSGNTESTPLN	DEC78/MAR79DEC78/APR79	E	
416379	DSGNFABOFEQUIP	DEC78/APR79APR79/MAY79	E	
416379	INSTALLOFEQUIP	APR79/MAY79MAY79/MAY79	E	
416379	EXECUTIONOFTESTPLN	JUN79/JUN79AUG79/NOV79	E	
416379	FIRINGTEST (PROVGRD)	AU079/DEC79SEP79/MAR80	E	
416379	PRODPROCDSGNS	NOV79/NOV79SEP79/DEC79	E	
416379	FINALRPTARRADCOM	DEC79/JAN80SEP80/	E	
416379	FINAL301RPT	SEP80/	(ADD) E	
418979	RECEIPTFUNDS	AUG79/AUG79AUG79/AUG79	M	
418979	AWARDOPCONTRACT	APR79/APR79SEP79/SEP79	M	
418979	PURCHASESTEEL	OCT79/OCT79FEB80/MAR80	M	
418979	CHARSTEEL	FEB80/FEB80JUN80/	M	
418979	FINALRPT	JUL80/	AUG80/	M
418980	RECEIPT FUNDS	NOV79/NOV79NOV79/NOV79 (ADD)	M	
418980	AWARD OF CONTRACT	NOV79/NOV79JUL80/	M	
418980	PROCOPT	JUL80/	FEB81/	M
418980	OPTFORGINGPRESS	APR80/	JUL80/	(ADD) M
418980	EVEMULTIPARTING	JUL80/	SEP80/	(ADD) M
418980	DETNEEDFORSPHEROIDIZEANNEAL	SEP80/	NOV80/	(ADD) M
418980	EVALMACHINETOOLS	OCT80/	DEC80/	(ADD) M
418980	FINAL REPORT	MAR81/	APR81/	(ADD) M
418980	FINALRPT301	APR81/	APR81/	(ADD) M
419479	FISCALOBLIGATION	MAY79/MAY79JUL79/JUL79	M	
419479	PRELIMSTUDY	JUN79/JUN79SEP79/SEP79	M	
4194	PROCS/FABOFTSTEQUIP	DEC79/AUG79OCT80/	M	
419479	STDYPROCSAEQUIPPARMETERS	DEC79/DEC79JAN81/	M	
419479	HAZARDANAL	SEP79/	NOV80/	M
419479	PERFTECHAECONANAL	NOV80/	JAN81/	M
419479	PREPRTPAKERECOMM	JAN81/	MAY81/	M
420080	PROTOSUNCOMPL	NOV80/NOV80MAR80/MAR80	E	
420080	SYSEVAL	JAN80/JAN80SEP80/	E	
420080	FINAL301RPT	SEP80/	FEB81/	E
420270	LABSTUDY	DEC70/DEC70APR71/JUN74	E	
420270	PROC+INSTALLBENCHSCALEEQUIP	MAR71/MAR71JUN71/JUN71	E	
420271	LABSTUDY	DEC70/DEC70AUG71/AUG71	E	

420271	PROC+INSTALLBENCHSCALEEQUIP	MAR71/MAR71SEP71/JAN72	E
420271	PERBENCHSCALESTUDY+COMPILEDATA	JUN71/JUN71JUL72/JUL72	E
420271	SELPROC	JUN71/JUN71NOV71/NOV71	E
420271	ESTABPLOTLINEGN	NOV71/OCT71DEC71/DEC71	E
420272	MOBLDGFORPILOTLINE	JAN72/DEC71JUN72/JUN72	E
420272	PROC+INSTALLPILOTLINEEQUIP	JAN72/JAN73SEP72/OCT73	E
420272	PERPLOTSCALESTUDY+COMPILEDATA	OCT72/OCT72JUN73/OCT73	E
420272	ESTABFACDSGNCRITERIAFORCORPSOENGRS	MAR73/JAN73JUN73/OCT73	E
420272	MOBLDGFORTHERMALDEHT	JAN73/JAN73JUN73/JUN73	E
420273	PROC+INSTALLTHERMALDEHY	JAN73/JAN73SEP73/SEP75	E
420273	PROC+INSTALLPILOTLINEEQUIP	JAN72/JAN72JUL74/JUL74	E
420273	PERPILOTSCALESTUDY	OCT72/OCT72JUL74/MAR75	E
420273	ESTABFACDSGNCRITERIAFORCORPSOENGRS	MAR73/JAN73AUG74/DEC74	E
420273	INITIATEFINALROT	MAR74/JUN74MAR75/MAR75	E
420273 THRU 75	PROC+INSTALLSEGSCREWS	MAY75/MAY75AUG75/AUG75	E
420273 THRU 75	PERDSGNIMPVMTENGR	JUN75/JUN75MAR76/JUN76	E
420273 THRU 75	PERPILOTSCALESTUDY+COMPILEDATA	JUL75/JUL75DEC75/APR76	E
420275	MFGPILOTLOTSFORBALLISTICTEST	NOV75/MAR76DEC75/APR76	E
420275	CONDUCTBALLISTICTEST	DEC75/JUN76JUN76/JUN76	E
420276	PERDSGNIMPVMTENGR	MAY76/JUN76JUN76/JUN76	E
420276	PERPILOTSCALESTUDY+COMPILEDATA	MAY76/JUN76DEC76/SEP76	E
420277	PERDSGNIMPVMTENGR	SEP76/SEP76FEB77/FEB77	E
420277	PERM30ATPRODEV	JAN77/FEB77JUN77/JUN77	E
420277	PERPILOTSCALESTUDY+COMPILEDATA	SEP76/SEP76JUN77/ (DEL)	E
420277	MFGM30ATPILOTLOT	JUN77/ JUN77/ (DEL)	E
420277	CONDUCTBALLISTICTESTOFM30A1	JUL77/ SEP77/ (DEL)	E
420277	MFGM26ETPILOTLOTFORBALLISTICTEST	OCT76/ DEC76/ (DEL)	E
420277	CONDUCTBALLISTICTESTOFM26E1	JAN77/ MAR77/ (DEL)	E
420277	PILOTLINESCALESTUDY+COMPILEDATA	SEP76/SEP76DEC77/JAN78	E
420277	MFGM30A1PILOTLOT	JUN77/ JUN77/AUG77/AUG77	E
420277	CONDUCTBALLISTICTESTOFM30A1	SEP77/SEP77DEC77/SEP78	E
420277	COMPLPROCPARFORM26E1+CONDLABTEST	SEP77/SEP77NOV77/JUN78	E
420277	PREFINALTECHRPT	SEP77/SEP77APR80/	E
420277	FINAL301RPT	MAY80/MAY80JUN80/JUN80	E
421080	FUNDINGRECVDGOGO	NOV79/DEC79NOV79/DEC79	E
421080	FUNDINGRECVDGOCO	SEP80/ SEP80/	E
421080	ENGRDSON	SEP80/ JAN81/	E
421080	BLDGMD	JAN81/ JUL81/	E
421080	PROC+FABEQUIP	FEB81/ JUL81/	E
421080	INSTALLEQUIP	JUL81/ SEP81/	E
421080	EQUIPDEBUG	SEP81/ DEC81/	E
421080	EVAL/PILOTLUTMFG	DEC81/ MAR82/	E
421080	HAZARDANALYSIS	SEP80/ MAR82/	E
421080	PILOTLOTTEST	FEB82/ MAR82/	E
421080	FINALRPT	MAR82/ MAY82/	E
421176	COMP+EVALDATACONCPTEAUTOCNT(TASKI)SEP75/SEP75DEC75/MAR76	(DEL)	E
421176.77	DEVSIGNCRIT+PRFPSCOPEFORPROCPROTSYS	JAN76/JAN76JUN76/OCT76	E
421176.77	PROCPUTOCNTLSYST	JUN76/JUL76MAR79/MAR79	E
421177	INSTALLPROTOCNTLSYSTFOREVAL	DEC78/DEC78JUN80/	E
421177	COMPL+EVALDATAFRONLINEPROCCNTLOPER	FEB80/MAY80 JUN80/	E
421177	PREFINALRPT (TASKII)	JUN80/ AUG80/	E
421177	LITSER+REVOPTRORART(TASKIII)	SEP78/SEP78SEP78/SEP78	E
421177	EVALTESTIMTHTYPE3+TYPE12IMPACTDEVICE	SEP78/SEP78SEP78/SEP78	E
421177	REPEATABOVEV/MODS	SEP78/SEP78OCT78/OCT78	E
421177	CONFIRMFULATION+REV	OCT78/OCT78MAR79/APR79	E
421177	SELFCNTR+AWARDOFCONTRACT	FEB79/FEB79OCT79/ (DEL)	E
421177	DSGN+FABOFAUTOMPCTINSTRU	OCT79/ JUN80/ (DEL)	E
421177	COMPTRPROG	OCT79/ JAN81/ (DEL)	E
421177	PRELSAFETYAPPVLDSGNPHORTOFAB	JAN80/ OCT80/ (DEL)	E
421177	ENGRREVSITEMODRQDFORMACHINSTALL	DEC79/ JUN80/	E
421177	FINALSAFETYINSPCTS+APPVL	APR80/ JUN80/ (DEL)	E
421177	PREPSITE+INSTALLAUTOIMPACTMACH	MAY80/ JUL80/ (DEL)	E
421177	EVAL+TESTAUTOIMPACTMACH	AUG80/ FEB81/ (DEL)	E
421177	STA1ANALOFDATA	JAN80/ JUL80/	E
421177	WRITE+ISSUEFINALENRRPT	APR80/ JUL80/	E
421177	PARTSFAB.	NOV79/NOV79JUN80/ (ADD)	E

421177	MACHINE CONSTRUCTION	NOV79/NOV79JUN80/	(ADD) E
421177	MACHINE DEBUG	FEB80/FEB80 JUL80/	(ADD) E
421177	PROGRAM PROCESSOR	NOV79/NOV79JUL80/	(ADD) E
421177	INTERFACE PROCESS W/MACH.	FEB80/FEB80JUL80/	(ADD) E
421177	DEMO TEST SPEC	JUN80/ JUN80/	(ADD) E
421177	DEBUG AUTO SYS	JUN80/ SEP80/	(ADD) E
421177	DEMO TEST	SEP80/ OCT80/	(ADD) E
421177	REPORT	MAR80/ AUG80/	(ADD) E
421177	ENGR DRAWINGS	AUG80/ AUG80/	(ADD) E
421177	DUP FAB	JUN80/ SEP80/	(ADD) E
421177	INSTALL+DEBUG PLANT	OCT80/ OCT80/	(ADD) E
421177	CALIBRATE	OCT80/ NOV80/	(ADD) E
421177	IMPLEMENTATION	DEC80/ DEC80/	(ADD) E
421177	FINAL301RPT	NOV80/ DEC80/	E
421478,79	ANAL PROG ABATE TECH CHG STS + OPER STATUS	OCT77/MAY78SEP79/	E
421478,79	CNDLMTGS+MAINLIAISONW/OGA ASSESS ENVIR	OCT77/MAR78SEP79/	E
421478,79	SUSTECMREQACT	OCT77/MAR78SEP79/	E
421478	ESTABPROCWATERSPECQUAL+QUANT(RAAP)	MAY78/MAY78JUL78/JUL78	E
421478	QUAL+QUANT POLLUTATE WATERS	AUG78/AUG78SEP78/SEP78	E
421478	EVAL PRACTECON+ENGY	OCT78/OCT78JAN79/JAN79	E
421478	DETMINREQDTREAT	FEB79/FEB79MAR79/MAR79	E
421478	FINALRPTRECSCHOFPROPREUSEMEAS	APR79/APR79OCT79/NOV79	E
421478	ESTABPROCWATERSPECQUAL+QUANT(HAAP)	SEP78/SEP78FEB79/FEB79	E
421478	QUAL+QUANT POLLUTATE WATERS	FEB79/FEB79APR79/APR79	E
421478	EVAL PRACTECON+ENGY	MAY79/MAY79 JUL79/JUL79	E
421478	DETMINREQDTREAT	AUG79/AUG79SEP79/NOV79	E
421478	FINALRPTRECSCHOFPROPREUSEMEAS	OCT79/OCT79DEC79/DEC79	E
421478	USGN+ENGRS HALL SCALE TEST MODULES	JUN78/ AUG78/	E
421478	PROC+ASSY OF EQUIP	JUL78/ DEC78/	E
421478	PROC EQUIP (PHASE I)	AUG78/AUG78OCT78/FEB79	E
421478	INSTALL+ASSY	NOV78/NOV78APR79/APR79	E
421478	PROC EQUIP (PHASE 2)	DEC78/DEC78APR79/	E
421478	PROFUNDING	OCT77/OCT77MAR78/MAY78	E
421478	ENGR STUDIES	MAY78/MAY78JUL78/JUL78	E
421478	BENCHSCALE EVAL	JUL78/JUL78JAN80/	E
421478	HAZARD ANAL	JUN78/JUN78JAN80/	E
421478	PILOT PLANT INSTALL	JAN80/ JUL80/	E
421479	PROC PILOT PLANT FAC(RAAP)	NOV79/NOV79JAN80/	(ADD) E
421479	INSTALL PILOT PLANT SYST	JAN80/ FEB80/	(ADD) E
421479	PILOT PLANT EVAL	FEB80/ JUL80/	(ADD) E
421479	ECO ENGY EVAL	JUL80/ AUG80/	(ADD) E
421479	PREP OF DATA FOR SGNCRIT	JUL80/ SEP80/	(ADD) E
421479	DOC+FINALRPT	AUG80/ NOV80/	(ADD) E
421479	ETABPROCWATERSPCSQUAL+QUANT(KAAP)	AUG79/AUG79DEC79/	(ADD) E
421479	QUAL+QUANT POLLUTATE WATERS	DEC79/ MAR80/	(ADD) E
421479	EVAL PRACTECON+ENGY	MAR80/ JUL80/	(ADD) E
421479	DETMINREQDTREAT	AUG80/ SEP80/	(ADD) E
421479	FINALRPTRECSCHS PROPREUSEMEAS	SEP80/ OCT80/	(ADD) E
421479	TEST+EVAL STUDIES ANAL+ECO EVAL DATA	OCT79/ DEC79/	E
421479	HAZARD ANAL	NOV79/ FEB80/	E
421479	FINALRPT	MAR80/ APR80/	E
421479	TEST+EVAL	APR79/MAY79 JUL79/	E
421479	FINALRPT	AUG79/ NOV79/	E
421479	INSTALL+ASSY	MAY79/ JUL79/	E
421479	TEST+EVAL	AUG79/ NOV79/	E
421479	FINALRPT	DEC79/ MAR80/	E
421479	PILOT PLANT EVAL	JAN80/ MAR80/	(ADD) E
421479	DEV+SGNCRIT	APR80/ AUG80/	(ADD) E
421479	FINALRPT	JUN80/ SEP80/	(ADD) E
421479	ENGR REVIEW	SEP79/SEP79NOV79/NOV79	(ADD) E
421479	INVESTIGATE TOYS	NOV79/NOV79JUN80/	(ADD) E
421479	PILOT JOB PREP	JUN80/ AUG80/	(ADD) E
421479	DATA ANAL/FINALRPT	JUL80/ SEP80/	(ADD) E
421479	DSGN+PROC CONST LAB EQUIP	AUG79/AUG79JAN80/	(ADD) E
421479	BENCHSCALE STUDY	FEB80/ JUL80/	(ADD) E
421479	FINALRPT	AUG80/ SEP80/	(ADD) E

421479	ENGROSGNSTUY(VAAP)	AUG79/AUG79JAN80/	(ADD)	E
421479	FINALRPT(VAAP)	FEB80/	MAR80/	(ADD) E
421479	ENGRPREP(BAAP)	AUG79/AUG79SEP79/AUG79	(ADD)	E
421479	LEASINGEQUIP(BAAP)	SEP79/SEP79DEC79/	(ADD)	E
421479	TSTOFEQUIPAMATL(BAAP)	DEC79/	SEP80/	(ADD) E
421479	FINALRPT(BAAP)	OCT80/	NOV80/	(ADD) E
421478	CNTRAWARD(PHASE4)	DEC78/DEC78MART79/MAR79	(ADD)	E
421478	DEVOFANALYST	APR79/APR79MAY79/JUN79	(ADD)	E
421478	INSTALLAASSYOFFQUIP	JUN79/JUN79JUN79/JUN79	(ADD)	E
421478	TESTAEVAL	JUL79/JUL79OCT79/OCT79	(ADD)	E
421478	FINALRPT	OCT78/OCT79DEC79/	(ADD)	E
421573	COMPLAEVALIDATA	AUG72/AUG72DEC72/DEC72		E
421573	PROGSEVALIDATA	DEC72/DEC72JUN73/JUN73		E
421573	PREDSGNCRIT	JAN74/MAY74JUN74/JUN75		E
421574	PROTOCNTLSYS	JUN78/JUN74APR75/AUG76		E
421574	PROTOCNTLSYSACC	JUN76/JUN77JUN76/NOV79		E
421574	TDP COMPL	JUN76/JAN79JUL76/JUN80		E
421573,74	PROJPHYSACOMPL	JUN80/JUN80JUN80/JUN80		E
421573,74	PROJFISCALCOMPL	JUN80/JUN80JUN80/JUN80		E
421573,74	PROJCLUSEOUT	OCT72/NOV72NOV72/NOV72		E
422373	PILOTPLANTSCOPOFWORK	NOV74/FEB73FEB73/FEB73		E
422373	PILOTPLANTCONTAWARD	FEB73/FEB73MAR73/MAR73		E
422373	PILOTOSGN	MART3/MART3JUN73/JUN73		E
422373	PILOTFAB	JUL73/JUL73SEP73/SEP73		E
422373	PILOINSTALL	FEB74/FEB74JUL74/DEC74		E
422373	PILOTACCPD	SEP74/APR75DEC74/AUG75		E
422373	FINALRPT	NOV74/NOV74JAN75/JAN75		E
422374	PROTOPLANTSCOPOFWORK	FEB75/FEB75MAY75/FEB76		E
422374	PROTOPLANTCNTRAWARD	JUL75/FEB76OCT75/APR76		E
422374	PROTOODSGN	SEP75/MAR76JAN76/AUG76		E
422374	PROTOFAB	APR76/AUG76MAY76/SEP76		E
422374	PROTOINSTALL	MAY76/JAN79JUL76/FEB79		E
422374	PROTOACCPD	MAY76/NOV78SEP76/DEC78		E
422374	FINALRPT	OCT76/DEC76DEC78/JAN79	(ADD)	E
422374,77	EQUIPMOD	AUG77/AUG77FEB79/FEB79	(ADD)	E
422374,77	PROTOEVAL	OCT76/DEC76DEC76/FEB77	(ADD)	E
422377	PROGAUTHORIZATION	DEC76/DEC76JUN77/DEC77		E
422377	MFG/PROCFCRPOCOLLOID	JAN77/FEB79JUN77/MAR80		E
422377	CONDUCTEXTRUSTUDIES	JAN79/ FEB79/ (DEL)	E	
422377	FABPROPCHGS	APR80/ MAY80/ (DEL)	E	
422377	LOAD+TEST	FEB79/ MAR80/ (DEL)	E	
422377	ECOANAL	JAN77/NOV75OCT77/JUN77		E
422377	HAZARDANAL	MAR80/MAY80AUG80/		E
422377	DWG+RAMDOC	AUG80/ SEP80/		E
422377	FINALRPT	SEP77/MAY80SEP80/		E
422377	FINALTECHRPT	MAY80/MAY80SEP80/	(ADD)	E
422377	HAZARDANALSUPPL	JAN79/JAN79MART79/JUL79		E
422579	PROJFUNDING	JUL79/JUL79JUL80/		E
422579	CRITICALCOMPTSYAEVAL	JUL79/JUL79JUL80/		E
422579	PRELIMHAZARDANAL	JUL79/JUL79JUL80/		E
422579	ADAPTATIONSTUDIES	JUL80/ AUG80/		E
422579	PROJPHYSICALCOMPLETION	JUL80/ AUG80/		E
422579	PROJFISCALCOMPLETION	AUG80/ SEP80/		E
422579	PROJCLUSEOUT	SEP80/ OCT80/		E
422680	PROJFUNDING	APR80/APR80AUG80/		E
422680	CHECKOUTFIELDQUIPMENTORS	SEP80/ JUN81/		E
422680	ASSESSMENTINEMONITORPAR	JUN81/ AUG81/		E
422680	INTERIMRPT	AUG81/ SEP81/		E
422680	PROJPHYSACOMPL	OCT81/ OCT81/		E
422680	PROJFISCALCOMPL	OCT81/ OCT81/		E
422680	PROJCLOSEOUT	NOV81/ NOV81/		E
422680	PROGRAMAUTHORIZATION	AUG71/AUG71		E
422872	AWARDCONTRACT	JAN72/SEP72		E
422872,73	DSGNOFPROTOTYPE	JAN72/SEP72JUL72/SEP73		E
422874	COMPLETEFAASSYOFPROTOSYST	JUN72/SEP73JUL75/DEC75		E
422874	SHIPMENTTOPA	APR75/APR75AUG75/JAN76		E

422874	PABLDPREP+MOD	FEB75/FEB75JUL75/SEP75	E
422876	SYSTINSTALLATION	MAY75/MAY75SEP75/FEB76	E
422876,77,78	DEBUGOPERATIONATPA	JUN75/JUN75JUN76/JUN78	E
422877	FINALIZESCOPEOFWORKWRAPPERLINER	FEB77/FEB77APR77/FEB77(DEL)	E
422877	AWARDWRAPPERLINERCONTRACT	MAY77/MAY77JUL77/ (DEL) E	
422877	WRAPPERLINERFAR	AUG77/ DEC77/ (DEL) E	
*422877	FINALIZESCOPEOFWORK16LBSCALE	FE877/FEB77MAY77/ (DEL) E	
422877	AWARDSSCALECONTRACT	JUN77/ SEP77/ (DEL) E	
422877	SCALESTSTAB	OCT77/ MAY78/ (DEL) E	
422878	DEMONSTRATEEQUIP	JUL78/JUL78JUN78/JUL78(ADD) E	
422878	SHIPEQUIP	JUL78/JUL78AUG78OCT78(ADD) E	
423180	PROCPILOTPANTFAC	NOV80/ JAN81/ E	
*423180	INSTALLEPILOTPANTSYS	JAN81/ FEB81/ E	
423180	PILOTPLANTEVAL	FE881/ JUL81/ E	
423180	ECOAENERGYEVAL	JUL81/ AUG81/ E	
423180	PREDATAUSGNCRIT	JUL81/ SEP81/ E	
*423180	DOCAFINALRPT	AUG81/ NOV81/ E	
423180	ESTPROCH20SPEC5	APR80/APR80OCT80/ E	
*423180	QUALQUANTPULLARATEH20	OCT80/DEC80/ E	
423180	EVALPRACTECOENERGY	DEC80/ MAR80/ E	
423180	DETMINNEUTREAT	MAR81/ MAY81/ E	
423180	FINALRPT	MAY81/ JUN81/ E	
*423180	OVERALLPROJ301FINALRPT	JUN81/ JUL81/ E	
423680	RECEIPTOFFFUNDS	OCT79/JAN80 E	
*423680	PREPSCOPEOFWORK	OCT79/OCT79DEC79/JAN80 E	
423680	AWARDCONTR	DEC79/JAN80SEP80/ E	
423680	USGNPROTO	SEP80/ FEB81/ E	
423680	TESTPROTO	MAR81/ APR81/ E	
4236	DELTOLGADOPPLANT	MAY81/ JUN81/ E	
423680	DELTODPAFINALTECHRPT	SEP81/ SEP81/ E	
*423680	FINAL301RPT	SEP81/ SEP81/ (ADD) E	
423773	PROCENGRSERV	OCT72/AUG72JAN73/MAY73 E	
423773	FLOWDIA SITESEL	JAN73/MAY73MAR73/JUL73 E	
423773	PILOTPANTDSGN	FEB73/JUL73MAY73/AUG74 E	
423774,76	COMPTHSIMUL	MAY73/MAY73MAR78/MAR78 E	
423774	USGNREV	FEB75/FEB75JUN75/JUL76 E	
423774	VENHORGHTRS	JUL75/JUL75OCT75/NOV75 E	
423774	EQUIPPROC	NOV75/NOV75DEC75/MAR77 E	
423774	EQUIPDEL	MAY76/MAY76MAR77/JUL77 E	
423774,76	HAZARDSANAL	JAN74/JAN74SEP80/ E	
423776	EQUIPINSTALL	JUN76/JUN77FEB77/JAN78 E	
423776	MECHTESTOFEQUIP	APR77/NOV78MAY77/JAN79 E	
423776	WHITECOMPDXINSTUDY	MAR77/MAR77AU677/OCT77(ADD) E	
423777	MECHTESTOFEQUIP	NOV78/NOV78DEC78/JAN79 E	
423778	PILOTPANTSTARTUP(PROVEOUT)	MAY79/ JUL79/ (DEL) E	
423778	FINALRPT+HAZARDSANAL	MAR79/MAR79SEP80/ (ADD) E	
423778	HAZARDSANAL	JAN74/JAN74JAN79/ (DEL) E	
423778	PROJPHYSICALCOMPL	JUN80/JUN80JUN80/JUN80 E	
423778	PROJPHYSICALCOMPI	JUN80/JUN80JUN80/JUN80 E	
423778	PROJCLOSEOUT	JUN80/JUN80JUN80/JUN80 E	
424974	DSGN	DEC73/DEC73MAR74/MAR74 E	
424974	EQUIPPROC+INSTALL	MAR74/APR74JUN74/JUN75 E	
424974	EQUIPEVAL	JUL74/JUL74MAR75/OCT75 E	
424974	FINALRPT(FY74EFFORT)	APR75/MAR77SEP75/MAY77 E	
424974	PILOTPANTSTOY	MAY75/ OCT76/ (DEL) E	
424974	BIRUPANNEVISFILTERSPEC	MAR76/MAR76OCT76/OCT76(ADD) E	
424975	PILOTPANTSTOOTES	MAR75/ OCT76/ (DEL) E	
424975	FINALRPT(FY75EFFORT)	SEP76/MAR77OCT76/JUN77 E	
424977	BIRUPANNEVISFILTERPROC+INSTALL	DEC76/DEC76SEP77/JAN79 E	
424977	EVALOFFILTER	OCT77/ DEC77/ (DEL) E	
424978	HAZARDSANAL	AUG78/AUG78APR79/APR79(ADD) E	
424978	EQUIPTEST	JUL80/ AUG80/ E	
424978	PILOTPANTTOPER	JUL79/ DEC79/ (DEL) E	
424978	ECOEVAL	AUG79/ DEC79/ (DEL) E	
424978	BIRUPANNEVISFILTERINSTAL	FE879/FEB79JUN80/ (ADD) E	
424978	FINALRPT	NOV80/ APR81/ E	

424978	FINAL301RPT	OCT80/	DEC80/	(ADD)	E
425274	EXPERSTDYCONTPROCFORMFG0FRDX+HMX	SEP73/	SEP73DEC74/OCT77		E
425274	TOP	DEC74/	JAN75/	(DEL)	E
425274,75	PRODIMPLRDX/HMXPROCIMPV	JUL74/JUL74DEC75/OCT74			E
425274,75	EQUIPPROC+INSTALL(ARRADCOMPILOTPLANT)	OCT74/OCT74DEC75/MAY79			E
425275	EXPERSTDYOFPROCFORMGRDX/HMX	SEP73/	SEP73DEC78/	(DEL)	E
425275	USEOFCRUEDEACETICANHYDRIDE(LABSTUDY)	DEC74/DEC74DEC75/SEP76			E
425275	FINALRPT	NOV77/NOV77MAY79/JUN79			E
425277	PRODPROVEOUTCRUDEACGTICANHYDRIDE	MAR77/MAR77JUN77/JUN77			E
425277	COMP-C-4STUDY	JAN77/JAN77JUN77/DEC77			E
425277	COMP-A-STUDY	DEC76/DEC76JUN77/DEC77			E
425277	ENGRPTPRODPROVEOUTCRUDEACETICANHYD	MAY77/JUL77JUN77/JAN78			E
425277	CORPC-4STUDY	JUN77/DEC77JUL78/APR79			E
425277	*A-COMPSTUDY	JUN77/DEC77JUL78/JUN78			E
425277	RDX/HMXYIELDIMPVT	JUN77/OCT77APR78/MAY79			E
425277	PILOTPLANTREACTVAROPT	JUN79/	NOV79/	(DEL)	E
425277	FINALRPT(FY77EFFORT)	FEB78/APR80MAR78JUN80			E
425278	PRODSIMMERPROC	MAR79/MAR79MAR78/MAY80			E
425278	PRODSIMMERPROC	MAR79/MAR79NOV79/		(DEL)	E
425278	MODEXAMINEFEEDINCRMHMAYIELD	APR80/	AUG80/	(DEL)	E
425278	ADJVÄRFOROPTYIELD	AUG80/	DEC80/	(DEL)	E
425278	PRODPROVEOUTRDX/HMXPROCIMPVT	JAN78/	JAN79/	(DEL)	E
425278	PILOTPLANTPREPOFSTDHMXBATCH	OCT79/NOV79DEC79/DEC79(ADD)		E	
425278	FINALRPT	APR80/APR80JUL80/			E
425278	PILOTPLANTPROCVARSTDYFORHMX	DEC79/DEC79JUN80/		(ADD)	E
426374	SYSTSTUDY	AUG73/NOV73MAR74/DEC74			E
426374	PILOTPLANTLINEAYOUT	AUG73/NOV73APR74/APR74			E
426374,75	PILOTPLANTDESIGN	NOV73/NOV73APR76/APR76(ADD)		E	
426374	CONVEYORSYST			(DEL)	E
426374,75	PROJWORKSTS			(DEL)	E
426374,75	EQUIPDSGN	MAR74/MAR74FEB76/MAR76(ADD)			E
426374,78	INSTRUMENTATION+CONTROL	JUN74/MAY74DEC74/MAY78			E
426375,77	PILOTPLANTCONSTRUCTION	MAR75/FEB77NOV75/JUL78			E
426375,77	EQUIPPAB	FEB75/FEB77JUN77/AUG77(ADD)		E	
426375,77	EQUIPPROCUREMENT	JAN75/JAN75JAN78/JAN78(ADD)		E	
426375,77	EQUIPTEST	APR75/APR75OCT77/OCT77(ADD)		E	
426376,77	PROCEQUIPINSTALL	SEP77/OCT77MAY78/JUN78(ADD)			E
426376	PILOTPLANTOPER	MAY78/JUN78JUN80/APR80			E
426376	FINALREPORT	APR78/APR78SEP80/			E
426379	FINAL301RPT	APR80/	SEP80/		E
426680	DETOSGMASSLINEYST	JUN80/	NOV80/		N
426680	FABCRITASSINSPATTESTSTA	AUG80/	DEC80/		N
426680	DEMOCRITASSINSPATTESTSTA	DEC80/	MAR81/		N
426680	PROCÉQUIP	MAR81/	SEP81/		N
426680	FABBALASSINSPATTESTSTA	JUL81/	DEC81/		N
426680	DEMOASSLINE	DEC81/	FE882/		N
426680	INTASSLINEINTOFUZEASSLINE	FE882/	APR82/		N
426680	FINALTECHRT	JUN82/	JUN82/		N
426680	FINAL301RPT	JUL82/			N
426775	LITSURV	JAN75/FEB75MAR75/JUN75			E
426775	BENCHSCALESTDY	JAN75/JUL75JAN76/AUG75			E
426775	PROCSIDY	JUN75/SEP75JAN76/DEC75			E
426775	FINALRPT	JAN76/JUN77APR76/JUN77			E
426777	DSGNCRIT	OCT77/OCT77DEC77/		(DEL)	E
426777	SITEPLAN	DEC77/	JAN78/	(DEL)	E
426777	PROCEVAL	OCT77/OCT77MAR79/MAR79(ADD)		E	
426777,78	PRELIM HAZARD ANAL	JAN79/FEB79APR80/			E
426777,78	FINAL HAZARD ANAL	MAY80/	SEP80/	(ADD)	E
426777,78	CTRNEQ	MAR79/APR79AUG79/AUG79(ADD)		E	
426777	PRELIM PILOT PLT DSGN	AUG79/SEP79FEB80/			E
426777	FINAL PILOT PLT DSGN	MAY80/	JUL80/	(ADD)	E
426777,78	EQUIPPROC+INSTALL	JUN80/	MAR81/		E
426777,78	INERTMECHCHECKOUTSYST	MAR81/	MAY81/		E
426777	FINALRPT	APR81/	JUN81/		E
426778	LIVECHECKOUT	JUN81/	AUG81/	(ADD)	E
426778	ENDITEMLOG/TEST	JUL81/	NOV81/	(DEL)	E

4267 78	FINALRPT	SEP81/	DEC81/	(ADD) E
428076	FISCOBLIG	SEP75/	SEP75/	N
428076	SCOPEOFWORK	SEP75/	SEP75/	N
428076	CONJAWARD	OCT75/	JAN76/JAN76/MAR76	N
428076	CMPLOFSTUDYPHASE	JAN76/	MAR76/JUL76/SEP76	N
428076	CMPLOFTDP	MAY76/	JUN76/JUL76/AUG76	N
428076	FINALRPT(DSONSTDY)	JUN76/	SEP76/AUG76/SEP76	N
428076	SCOPEOF WORK (AMEND)	NOV76/	DEC76/DEC76/JAN77	N
428076	CONTRACT(AMENDED)	JAN77/	JAN77/MAR77/AUG77	N
428077	SCOPEOFWORK	OCT77/	DEC76/NOV76/JAN77	N
428077	CONTRAWARD	NOV76/	JAN77/FEB77/AUG77	N
428077	EQUIPfab	MAR77/	APR77/DEC78/FEB79	N
428077	EQUIPDEBUG+MOD	DEC77/	NOV77/JUN79/JUN79	N
428077	DOCUMENTATION	JAN78/	JAN78/AUG79/DEC79	N
428077	FINALRPT	SEP79/	NOV79/DEC79/DEC79 (ADD)	N
428176THRU79	INVENTORYSELPLANTS	JUL75/	JUL75/JUL80/	E
428176THRU79	EVALDATAFRINITIALPLANTS	DEC75/	OCT76/	(DEL) E
428176THRU79	EVALDATAFRSELPLANTS	APR76/	APR76/APR76/APR80/	(ADD) E
428176THRU79	DEF0FTECHREQTS	JUL76/	JUL76/MAR79/SEP79 (ADD)	E
428176,77	APPLRHTHERMOGRAPHYFORPROCINVENTORY	JUL75/	JUL75/JUL76/OCT77/OCT77	E
428176	SELCONT+ISSUECONT	MAY76/	MAY76/SEP76/SEP76	E
428176	IDENTWASTEHATEATRECAPPLS	OCT76/	OCT76/AUG77/JUL77	E
428176	IDENTADWASTEHATEATRECAPPLS	JAN78/	OCT77/FEB78/NOV77	E
428176	FISCALOBLIG	OCT75/	OCT75/OCT75/OCT75/OCT75	E
428176	ACTTEAMFORMED	OCT75/	OCT75/OCT75/OCT75/OCT75	E
428176	SAAPSURSCOPEOFWORK	OCT75/	OCT75/OCT75/OCT75/OCT75	E
428176	SAAPENERGYINVENTCONTPLACED	JAN76/	JAN76/APR76/APR76	E
428176	SAAPENERGYINVENTORY	APR76/	JUL76/FEB77/FEB77	E
428176	FISMOBLIG	OCT75/	OCT75/OCT75/OCT75/OCT75	E
428176	PREPSCOPEOFWORK	JUL75/	JUL75/JUL75/JUL75/JUL75	E
428176	PLACESTDYCONT	AUG75/	AUG75/NOV75/JUN76	E
428176	CUNDORGESTDY	JAN76/	JUL76/JUL76/JUL76/FEB77	E
428176	PREPPILOTPRODSCOPEOFWORK	JUL76/	JUL76/SEP76/SEP77	E
428177,78,79	INVENTORYRMGPLANTS	OCT76/	JUN77/	(DEL) E
428177,78,79	EVALDATAFRREPLANTS	DEC76/	OCT77/	(DEL) E
428177,78,79	DEF0FTECHREQ+COMPLOFFINALRPTS	OCT77/	MAR77/	(DEL) E
428177	SELCONT+ISSUECONT	JAN77/	FEB77/APR77/JUL77	E
428177	ESTABPERFDATA	APR77/	JUL77/JUL78/FEB78	E
428177	PERFHAZARDSANALYSIS	JUN77/	JUL77/JAN78/DEC77	E
428177	SAAPRPT	FEB77/	FEB77/APR77/APR77	E
428177	LCAAPSCOPEOFWORK	OCT76/	OCT76/OCT76/NOV76/NOV76	E
428177	LCAAPCONTPLACED	DEC76/	DEC76/APR77/JUN77	E
428177,78	LCAAPENERGYINVENTORY	APR77/	JUL77/FEB78/NOV77	E
428177	PLACEPILOTPRODCONT	JAN77/	MAY77/JUL77/NOV77	E
428177	MARKEPILOTPRODQUANT	FE879/	FEB79/MAR79/MAR79	E
428177	EVALREPILOTPROD	APR79/	APR79/APR79/APR79	E
428177	PREPFINALRPT	APR79/	APR79/DEC79/	E
428178,79	FINALRPTS	DEC77/	MAR78/JUL80/	(ADD) E
428178,79,80	ENGRDSGNCONST+TESTPILOTFAC	JUL78/	JUL78/JUL78/MAY81/	(ADD) E
428178	FINALRPT	JUL78/	JUL78/JUL78/AUG78/AUG78 (ADD)	E
428178	ENGRDSGNPILOTFACFORADUWASTERECAPPLS	MAR78/	JUN78/	E
428178,79	ENGRDSGNCONST+TESTPILOTFAC	JUL78/	JUL78/MAR80/	E
428178	SELCONT+ISSUECONT	JAN78/	JAN78/JUL78/JUL78/JUN78	E
428178	DETAVALB10MASS+NSTL/MSAAPFUELREQMTS	JUL78/	JUN78/AUG78/AUG78/AUG78	E
428178	SUR+SELCOMMERAVAILPROCWOODWASTEUTIL	AUG78/	AUG78/AUG78/OCT78/NOV78	E
428178	PREPECO+ENVIRSTATEONSELUNIT	NOV78/	DEC78/FEB79/AUG79	E
428178	FINALRPT	FEB79/	AUG79/MAR79/	E
428178	SELCONT+ISSUECONTFORPHASEII	APR78/	APR78/APR78/JUL78/JUL78 (ADD)	E
428178	DSGNPILOTPLANT	JUN80/	JAN81/	E
428178	PUR+INSTALLPILOTPLANT	JAN81/	JUN81/	E
428178	TEST+EVAPILOTPLANT	JUN81/	JUL81/	E
428178	FINALRPT	AUG81/	SEP81/	E
428178	LCAAPRPT	MAR78/	DEC77/MAY78/APR78	E
428178	ADC*LEFFORTSDEF	APR76/	APR76/FEB76/FEB79/FEB79	E
428178	FINALRPT	FEB79/	FEB79/FEB79/MAY79/MAY79	E
428178	FISCOBLIG	OCT77/	FEB78/OCT77/FEB78	E

428178	RECSCOPEOFWORK	JUL77/SEP77AUG78/FEB78	E
428178	RECCONTPLACED	SEP77/APR78JUL78/JUL78	E
428178	PLANTDSSNSTDY	AUG78/AUG78DEC78/DEC78	E
428178	OPTMECSYST	JAN79/JAN79JUN79/JUL79	E
428179	STATEOPARTREV	OCT79/SEP79DEC78/OCT79	E
428179	SELOPPROTOBEEYAH	JAN79/ FEB79/ (DEL)	E
428179	SELOPINSULTYPE+APPL	FEB79/NOV79JAN80/	E
428179	TESTOFSELAPPL	JUL79/ AUG79/ (DEL)	E
428179	EVALOFINSULBOILTUB	FEB80/ JUN80/ (ADD)	E
428179	FINALRPT+RECOM	JUL80/ SEP80/	E
428179	SURVEYOPUSUSAGE+TRAAP	OCT78/AUG79 NOV79/NOV79	E
428179	ENGRSTDYOFCOALGASPROC	SEP79/ MAR80/	E
428179	EVALCOALGASFORUSEINRAAPROC	NOV79/ MAY80/	E
428179	EVALOFALTPROC	MAR80/ MAY80/	E
428179	SELOPOPTIMUMSYST	APR80/ JUN80/	E
428179	HAZARDSANAL	NOV79/ APR80/	E
428179	DOC+FINALRPT	JUN80/ AUG80/	E
428179	CONST+TESTPILOTFACFORADDWASTERECAAPPLS	JUL78/ JUN79/	E
428180	FINALRPT	APR81/ JUN81/	E
428179	FINALRPT	APR80/ JUN80/	E
428179	INTERFACERECSYSTW/VARPLANTDSGNNS	APR79/ AUG79/ (DEL)	E
428179	PROVGOCO+SW/DATATOPREPP-15#S	MAR80/ MAY80/	E
428179	PREPFINALRPT	MAR80/ MAY80/	E
428180	ENGRDSGNPILOTFACFORADDWASTERECAAPPLS	APR80/ JUN80/ (DEL)	E
428180	CONST+TESTPILOTFACFORADDWASTERECAAPPLS	JUL80/ JAN81/ (DEL)	E
428180	FINALRPT(ADDWASTERECAAPPLS)	FEB81/ MAR81/ (DEL)	E
428179	DSGNOFRECOVSYSSTOW	MAR79/MAR79MAY79/MAY79 (ADD)	E
428179	AWARDOPCONTRACT	MAY79/MAY79OCT79/ (ADD)	E
428179	DSGNOFRECOVSYST	OCT79/SEP79 MAR80/ (ADD)	E
428576	RECEIVEFUNDS	SEPT5/SEPT5SEP75/SEP75	E
428576	TESTPLANDEV	SEP75/SEP75JUL76/NOV76	E
428576	TEST+EVAL	NOV75/JAN76DEC76/JAN77	E
428576	GEOMETRYEFFECTS	DEC75/MAY76NOV76/NOV77	E
428576	REP+PREP+DISTRIBUTION	MAR76/MAR76FEB77/JUN78	E
428577	RECEIVEFUNDS	AUG76/AUG76AUG76/AUG76	E
428577	TESTEVAL	SEP76/SEP76JAN77/JAN77	E
428577	PHEOPTECHRPTS	FEB77/FEB77SEP77/SEP77	E
428577	FINALREPORT	AUG78/AUG78AUG78/AUG78	E
428577	RECEIVEFUNDS	OCT76/FEB77OCT76/FEB77	E
428577	SCOPEOFWORK	OCT76/MAY77NOV76/MAY77	E
428577	CONTRACTAWARD	OCT76/MAY77NOV76/AUG77	E
428577	TESTPLANDEVELOPMENT	OCT76/MAR77SEP77/SEP77	E
428577	TEST+EVAL	DEC76/JUN77NOV77/MAR78	E
428577	GEOMETRYEFFECTS	DEC76/AUG77NOV77/MAY78	E
428577	REPORTPREP+DISTRIBUTION	FEB77/AUG77DEC79/NOV79	E
428578	RECEIVEFUNDS	OCT77/DEC77OCT77/JAN78	E
428578	SCOPEOFWORK+CONTRACTAWARD	OCT77/JAN78DEC77/MAY78	E
428578	TESTPLANDEV	OCT77/JAN78DEC78/JAN79	E
428578	TEST+EVAL	DEC77/APR78NOV78/JAN80	E
428578	GEOMETRYEFFECTS	DEC77/DEC77NOV78/NOV79	E
428578	RPTPREP+DIST	FEB78/FEB78FEB79/MAY80	E
428579	RECEIVEFUNDS	OCT78/OCT78NOV78/DEC78 (ADD)	E
428579	SCOPEOFWORK+CONTRALTAWARD	DEC79/DEC79MAR80/ (DEL)	E
428579	TESTPLANDEVELOP	NOV78/JAN79AUG79/AUG79 (ADD)	E
428579	TEST+EVAL	FEB79/FEB79NOV79/NOV79 (ADD)	E
428579	GEOMETRYEFFECTS	FEB79/FEB79NOV79/ (DEL)	E
428579	RPTPREP+DIST	JUN79/JUN79DEC80/ (ADD)	E
428579	FINAL301RPT	MAY81/	E
428580	RECFUNDS	OCT79/NOV79DEC79/NOV79 (ADD)	E
428580	TESTPLANDEV	NOV79/NOV79 AUG80/ (ADD)	E
428580	TEST+EVAL	FEB80/ NOV80/ (ADD)	E
428580	GEOMETRYEFFECTS	FEB80/FEB80SEP80/ (ADD)	E
428580	RPTPREPADISTR	JUN80/ MAY81/ (ADD)	E
428580	FINALRPT371	MAY82/	E
428877	SAFESEPARATIONTESTS	JAN77/MAR77OCT77/OCT78	E
428877	PRIMARYFRAGIMPACTTESTS	MAR77/APR77OCT77/OCT78	E

428877	SECONDARYFRAGIMPACTTESTS	MAR77/APR77OCT78/OCT78	E
428877	PREPOFTECHRPTS	JUN77/JUN78OCT78/OCT78	E
428878	SAFESEPARATIONTESTS	DEC77/JAN78OCT79/DEC79	E
428878	PRIMARYFRAGIMPACTTESTS	DEC77/JAN78OCT79/OCT79	E
428878	SECONDARYFRAGIMPACTTESTS	DEC77/JAN78OCT79/OCT79	E
428878	PREPOFTECHRPTS	JUN78/JUN78JUN80/JUN80	E
428879	SAFESEPARATIONTESTS	OCT78/JAN79OCT80/	E
428879	PRIMARYFRAGIMPACTTESTS	OCT78/JAN79OCT80/	E
428879	SECONDARYFRAGIMPACTTESTS	OCT78/JAN79OCT80/	E
428879	PREPOFTECHRPTS	JUN79/MAY79OCT80/	E
428880	SAFESEPARATIONTESTS	DEC79/DEC79-DEC80/	E
428880	PRIMARYFRAGIMPACTTESTS	JAN80/JAN80DEC80/	E
428880	SECONDARYFRAGIMPACTTESTS	JAN80/JAN80-DEC80/	E
428880	PREPOFTECHRPTS	JUN80/JUN80SEP81/	E
428976	RECYCFLUNDS(RAAPI)	SEPT75/SEPT75SEP75/SEPT5	E
428976	COMPHAZARDANALDATA	NOV75/NOV75AUG76/AUG76	E
428976	PRCTESTVEHICLESTRAAP11	DEC76/DEC76FEB77/MAR77	E
428976	HALFSCALEMODELTESTS	FEB77/MAR77MAR77/APR77	E
428976	ONETHIRTHSCALEMODELTESTS	MAR77/MAR77APR77/MAR77	E
428976	ONEFOURTHSCALEMODELTESTS	APR77/MAR77MAY77/MAR77	E
428976	DATAREDUCT+ANAL	APR77/APR77MAY77/MAY77	E
428976	FINALRPT	JUN77/JUN77FEB78/FEB78	E
428976	USGNMATHMODEL	JAN78/JAN78APR78/APR78	E
428976	SUBSCALETEST	MAR78/MAR78JUN78/JUN78	E
428976	CONTAWARD(13THRIII)	FEB76/FEB76MAY76/MAY76	E
428976	COMPLOFHAZARDSTESTDATA+ANAL	JUN76/JUN76NOV76/NOV76	E
428976	DEV01PROCHAZARDCLASSPROC	NOV76/NOV76JAN77/JAN77	E
428976	EVALSUBSCALETESTPROC	JAN77/JAN77AU77/AU77	E
428976	RECTULLSCALETESTPROC	AUG77/AUG77SEP77/SEP77	E
428977	CONTAWARD	JUL77/JUL77SEP77/NOV77	E
428977	COMPANALADDOACCIDENTDATA	NOV77/NOV77FEB78/FEB78	E
428977	CONDSENS+EFFECTSTEST	JUN78/JUN78OCT78/OCT78	E
428977	FINALHAZARDCLASSPROCS	SEP78/SEP78OCT78/OCT78	E
428977	INTERIMRPT	OCT78/OCT78NOV78/NOV78	E
428978	DATAANAL(MODEL)	JUL78/NOV78AUG78/JAN79	E
428978	FINALRPT	SEP78/FEB79MAR79/MAY79	E
428978	CNTAWARDTSUPPL	MAR78/MAR78JUN78/JUL78	E
428978	COMPLTESTMETHVALIDS	NOV78/NOV78APR79/APR79	E
428978	REV+ASSESSPROCSFORINCORPINTB700=2	APR79/APR79JUN79/JUN79	E
428978	DRAFTPROCSFORSAFETYAPPVL	JUN79/JUN79SEP79/SEP79	E
428978	COMPL+AANALPYROHAZARDTESTDATA(IV)	MAR78/MAR78SEP78/SEP78	E
428978	CONTESTTOEVALHAZARDUSTFORMATION	SEP78/SEP78NOV78/NOV78	E
428978	PREP PYROHAZARDSHDBK	NOV78/NOV78DEC78/DEC79	E
428978	FINALRPTHAZARDCLASSPROC	JUN79/JUN79OCT79/JUN80	E
428978	FINALRPT		
429176	ANALYTICALSTUDIES(TASK1)	OCT75/OCT75NOV76/NOV76	E
429176	TESTPLANDEV	OCT75/OCT75NOV76/NOV76	E
429176	TEST	JAN76/JAN76JUL77/JUL77	E
429176	TESTEVAL	JAN76/JAN76JUL77/JUL77	E
429176	RPTPREP	FEB76/FEB76NOV77/NOV77	E
429176	ANALYTICALSTUDIES(TASK2)	OCT75/OCT75MAR76/MAY76	E
429176	TESTPLANDEV	OCT75/OCT75MAY76/MAY76	E
429176	TEST	JAN76/JAN76OCT78/OCT78	E
429176	TESTEVAL	JAN76/JAN76NOV78/NOV78	E
429176	RPTPREP	FEB76/FEB76NOV78/NOV78	E
429177	TESTPLANDEV	JUN77/JUN77AUG77/AUG77	E
429177	TESTING(TREV6)	MAY79/MAY79JUL79/JUL79	E
429177	TESTEVAL (REV6)	JUN79/JUN79SEP79/SEP79	E
429177	REPORTPREP(TREV6)	AUG79/AUG79DEC77/JAN80	E
429179	ANALYTICALSTUDIES	JUN79/JUN79DEC79/DEC79	E
429179	TESTPLANDEV	SEP79/SEP79DEC79/DEC79	E
429179	TEST	JUN80/SEP80/	E
429179	TESTEVAL	JUN80/DEC80/	E
429179	REPORTPREP	JAN80/JAN80MAR81/	E
429179	FINAL30TRPT	SEP81/	E
429180	RECFUNDS	JAN80/JAN80JAN80/JAN80	E

429180	ANALSTUDYS	JAN80/JAN80JUN80/	E
429180	DEVUSGNCRIT	JUN80/ MAR81/	E
429180	RPTPREPADIST	SEP80/ SEP81/	E
429180	FINAL301RPT	SEP80/ SEP82/	E
430979	RELPROGAUTHORI	MAY79/MAY79JUL79/JUL79	E
430979	ENGRREVAGENPROCSTOY	JUL79/JUL79OCT79/	E
430979	HAZARDANAL	JUL79/JUL79 JUN80/	E
430979	POLUTABATMENT	JUL79/JUL79 JUN80/	E
430979	DSGNSTOYI	SEP79/SEP79JUN80/	E
430979	RELPROGAUTHORIT	MAY79/MAY79MAY79/MAY79	E
430979	REVRADPROCPARITY	MAY79/JUN79SEP79/NOV79	E
430979	ESTABPRLIMPRONPROCII	JAN80/ MAY80/	E
430979	PROTOEUTDOSGNTI	APR80/ NOV80/	E
431075	PILOTPLANTSCOPOFWORK	FEB75/FEB75MAR75/MAR75	E
431075	FEASTEST(DNSOPROD)	APR75/APR75JAN77/DEC77	E
431075	PILOTPLANTDSGN	MAR75/APR75JUL75/AUG76	E
431075,76+77	EQUIPPROC+INSTALL	JUL75/OCT75JAN76/FEB78	E
431075	FINALRPT	SEP76/NOV77SEP76/JUN78 (ADD)	E
431076	PILOTPLANTTEST	(DEL) E	E
431076	TDP	(DEL) E	E
431076	FINALRPT	APR77/JUN78APR77/JUN78	E
431076,77	HAZARDSANAL	JAN77/MAR77JUN77/JAN78 (ADD)	E
431077	DEBUGPILOTPLANT	(DEL) E	E
431077	EVAL+OPTOPROC	(DEL) E	E
431077	PROVEOUTCONTENDURRUN	(DEL) E	E
431077	FINALRPT	APR78/JUN78MAY78/JUN78 (ADD)	E
431078	DEBUGPILOTPLANT	NOV78/NOV78JAN79/FEB79	E
431078	EVAL+OPTOPROC	FEB79/FEB79SEP79/ (DEL) E	E
431078	PROVEOUTCONTENDURRUN	(DEL) E	E
431078	STARTINITIALDEROFPROC	FEB79/FEB79AUG79/AUG79 (ADD)	E
431078	FINALRPT	JUN79/APR80AUG79/MAY80	E
431079	EVAL+OPTOPROC	SEP79/AUG79NOV79/NOV79 (ADD)	E
431079	PROVEOUTCONTENDURRUNS	NOV79/OCT79 JAN80/NOV79 (ADD)	E
431079	PRODINCOP	DEC79/FEB80JAN80/MAY80 (ADD)	E
431079	PHY+CHEMTESTSOFPROM	AUG79/JAN80FEB80/ (ADD) E	E
431079	FINALRPT-PROC	JAN80/JAN80AU80/ (ADD) E	E
431079	QUALTESTS	JUL80/ DEC80/ (DEL) E	E
431079	ENDITEMTESTS	AUG80/ SEP81/ (DEL) E	E
431079	FINALRPT-PROJ	JUN81/ DEC81/ (ADD) E	E
431080	PROCTESTAEVAL	FEB80/FEB80SEP81/	E
431080	DOCTESTRESULTS	JUL81/ NOV81/	E
431080	FINALFY80RPT301	AUG81/ DEC81/	E
431080	OVERALLPROJFINAL301RPT	AUG81/ DEC81/	E
431176	FISCALOBLIGATION	OCT75/OCT75OCT75/NOV75	E
431176	SCOPEOFWORK	MAY75/MAY75OCT75/OCT75	E
431176	AWARDCONTRACT(PHASE1+2)	NOV75/NOV75MAY76/JUN76	E
431176	CONCEPTFORMULATION	JUN76/JUL76SEP76/OCT76	E
431176	USEN+BUILT-FEASMODELS	JUN76/AUG76AUG76/JAN77	E
431176	DEPMODELS	JUL76/OCT76SEP76/JAN77	E
431176	PRO10DSGN	JUL76/SEP76JAN77/FEB78	E
431176	MACHPROTOSBUILD+TEST	FEB77/FEB77OCT79/OCT79	E
431177	FISCALOBLIGATION	JAN77/JAN77JAN77/JAN77	E
431177	SCCPEOFWORK	SEP76/SEP76SEP76/SEP76	E
431177	AWARDOFCONTRACT	JAN77/JAN77MAR77/AUG77	E
431177	BUILDEQUIP	MAY77/AUG77SEP80/	E
431177	SHIPTOLOADPLANT	JAN79/JAN79OCT80/	E
431177	SETUP+FINALACCEPT	FEB79/FEB79DEC80/	E
431177	FINALTDP	NOV78/NOV78DEC80/	E
431177	FINALTECHRTP	JUN80/ JUN81/ (ADD) E	E
431177	FINAL301RPT	JAN81/ JAN81/ (ADD) E	E
431279	PRELIMSTUDY	DEC78/DEC78JAN79/JAN79	E
431279	PREPSCOPEOFWORK	DEC78/DEC78MAR79/APR79	E
431279	CONTRACTAWARD	MAY79/MAY79JUN79/AUG79	E
431279	HAZARDSANALYSIS	NOV79/DEC79SEP80/	E
431279	TEST+EVAL	MAY80/APR80FEB81/	E
431279	PROUDSGN	FEB81/ APR81/	E

431279	FINALRPT	APR81/	JUN81/	
431280	PREPSCOPEOFWORK	SEP79/SEP79	MAY80/MAY80	E
431280	CONTRACTAWARD	JUN80/	JUN80/	E
431280	TESTEVAL	JUL81/	MAR81/	E
431280	PRODDESIGN	APR80/	MAY81/	E
431280	FINALRPT	APR81/	JUN81/	E
431280	FINALTECHRPT	JUN81/	JUL81/	E
432278,79	TAILORUTFTECHBASE	AUG78/SEP78	SEP79/SEP79	A
432279	SCONTRACATAWARDS	JUL79/JUL79	SEP79/SEP79 (ADD)	A
432278	2NDREACTIVATIONJAAP	OCT78/OCT78NOV78/NOV78	(ADD) A	
432278	3RDREACTIVATIONJAAP	APR79/APR79MAY79/MAY79 (ADD)	A	
432278	1STPHASESTANDRYSIMPLJAAP	AUG79/AUG79DEC79/	(ADD) A	
432279	SHUTDOWNPCSATVAAP	AUG79/AUG79SEP79/SEP79 (ADD)	A	
432278	4THREACTIVATIONJAAP	OCT79/OCT79NOV79/NOV79 (ADD)	A	
432279	DOCTORIENTVAAPLAYAWAY	OCT79/OCT79OCT80/	(ADD) A	
432279	DEVBSCKNIFORMFAILUREPTPROC	NOV79/NOV79NOV81/	(ADD) A	
432278	2NDPMSESIMPLPRCJAAP	DEC79/DEC79DEC80/	(ADD) A	
432279	IDENTINITIALDATABASESFAAP	JAN80/	JAN81/	(ADD) A
432279	CYCLEPNUOCIAAAP	JAN80/	JAN81/	(ADD) A
432279	IDENTINITIALDATABASEVAAP	JAN80/MAR80DEC80/	(ADD) A	
432279,80	IDENTPRCMULTDNCSTORAGE	SEP79/SEP79FEB81/	(ADD) A	
432278,79	COMP+SYSTEVAL	AUG78/SEP78SEP80/	A	
432278,79	ONSITEMEASASDATABASE	AUG78/SEP78JUN81/	A	
432278,79,80	ONSITECYCLING	AUG78/SEP78JUN81/	A	
432278,79,80	ANALOFsuspectorFAILEDCOMPS	AUG78/SEP78JUN81/	A	
432279	INTERIMRPTI,FY78EFFORT	JUN79/JUN79JUN80/	A	
432279,80	DATA+TRENDANAL	JUN79/	JUN81/	A
432279,80	SPAREPTSPROVISIONING	SEP79/	JAN81/	A
432279,80	DEFUPPROCEDGUIMELINES	JUN79/	JUN81/	A
432279,80	DOC+FINALRPT	JUN79/JUN79FEB82/	A	
432280	INTERIMRPTII,FY79EFFORT	JAN80/	SEP81/	
432278	FINALRPT(FY78-701)	MAR80/	JUN80/	A
432279	FINALRPT(FY79-701)	MAR81/	JUN81/	A
432280	FINALRPT(FY80-701)	JAN82/	APR82/	A
432878	PROJAUTHORIZED	OCT77/JUL78OCT77/JUL78	M	
432878	PRCCOFPROTOCONTAINERS	MAY79/MAY79NOV79/NOV79	M	
432878	TESTPROTOCONTRS	DEC79/DEC79JUN80/	M	
432878	PIDSIGN(PID)PHASE	SEP78/SEP78JUL80/	M	
432878	PIPROTUREVIEW(PIPR)	JUL80/	JUL80/	(DEL)
432878	SELLINALDSGN	JUN80/	JUL80/	(ADD) M
432878	FINALRPTCOMPL	JUL80/	AUG80/	(ADD) M
433279	RECEIPTOFFFUNDS	FEB79/FEB79FEB79/FEB79	M	
433279	OBLIGATIONOFFFUNDS	FEB79/FEB79FEB79/FEB79	M	
433279	INVESTIGATEALTERNATIVES	SEP79/OCT79DEC79/JAN80	M	
433279	SAMPLEFAB	JAN80/JAN80JUN80/	M	
433279	SAMPLETEST	JUL80/	AUG80/	M
433279	EVALUATION	AUG80/	SEP80/	M
433279	FINALRPT	SEP80/	OCT80/	M
433579	MASTERLNREVIEW	SEP79/OCT79SEP79/OCT79	M	
433579	ENDAGPROGSTDYSEL	JAN80/NOV79FEB80/DEC79	M	
433579	FABPROCTOOLING	FEB80/JAN80MAR80/MAR80	M	
433579	MFRSAMPLEHARDWARE	MAR80/FEB80OCT80/	M	
433579	STATICDYNAMICTEST	OCT80/	JAN81/	M
433579	TESTEVALAPROCVR	SEP80/	JAN81/	M
433579	TOOLINGMOD	JAN81/	JAN81/	M
433579	MFRCOMPONENTSFORFINALTEST	FEB81/	FEB81/	M
433579	CONDUCTSTATACANISTERFIRINGTEST	MAR81/	MAR81/	M
433579	CONDUCTFINEVAL	APR81/	APR81/	M
433579	DEVPROSPEC	JAN81/	MAY81/	M
433579	MFRLOMPFORGYROVERIFTEST	FEB81/	MAR81/	M
433579	TESTOTNO	MAR81/	MAR81/	M
433579	EVALTESTRESULTS	MAR81/	APR81/	M
433579	FINALDATAPKG	APR81/	MAY81/	M
433579	COMPLETEFINALRPT	MAY81/	MAY81/	M
433776	TECM-EVALFORIGNATLS	SEP76/AUG76OCT76/JAN77	M	
433776	CONTAWARUPROCANDIDATEMATLS	SEP76/MAR77DEC76/MAY77	M	

433776	INHOUSE STUDY OF CANDIDATE MTL'S + PROC	OCT76/JAN77	JAN77/MAY77	M
433776	SEL OF MTL'S	JAN77/	FEB77/	(DEL) M
433776	FAB OF TEST HWR	FEB77/	JUN77/	(DEL) M
433776	TEST + EVAL (TECOM + ARRADCOM)	APR77/	SEP77/	(DEL) M
433776	INCORP INTOTDP	OCT77/	NOV77/	(DEL) M
433776	INHOUSE SEARCH FOR CANDIDATE MTL'S + PROC	JAN77/JAN77	JAN77/MAY77	M
433776	INHOUSE EVAL OF ALT	OCT77/OCT77	JAN78/SEP78	(ADD) M
433776	CONTRACT AWARD - EVAL (TC3 PHASE I)	AUG79/AUG79	APR80/APR80	(ADD) M
433776	EVAL OF CONTRACT RESUL TSATC3 PHASE I	APR80/APR80	MAY80/JUN80	(ADD) M
433776	GATOR / GEMMS / RAAMUV STUDY PHASE I	DEC79/DEC79	JUN80/	(ADD) M
433776	ADAMUV STUDY PHASE I	JAN80/	JUL80/	(DEL) M
433776	GATOR UV PHASE II	JAN80/	JAN81/	(DEL) M
433776	GEMMS UV PHASE II	JAN80/	APR81/	(DEL) M
433776	RAAMUV PHASE II	JAN80/	APR81/	(DEL) M
433776	ADAMATC3 TDP	MAR80/	MAY80/	(DEL) M
433776	GATOR UV TDP	MAY81/	AUG81/	(DEL) M
433776	GEMM UV TDP	MAY81/	AUG81/	(DEL) M
433776	RAAMUV TDP	MAY81/	AUG81/	(DEL) M
433776	ADAMUV RT	SEP80/	DEC80/	(DEL) M
433776	GATOR IN SITU BONDING	AUG79/AUG79	NOV79/NOV79	(ADD) M
433776	ADAMATC-3 TDP	MAR80/	MAY80/	(ADD) M
433776	GATOR RT	MAY80/	JUN80/	(ADD) M
433776	PROJECT COMPL	DEC80/	JAN81/	(DEL) M
433776	FINAL LRPT	FEB81/	FEB81/	(ADD) M
433776	FINAL 3D RPT	JUN80/	JUL80/	(ADD) M
433776	FINAL TECH RPT	JUN80/	JUL80/	(ADD) M
433876	CONTRACT AWARD (100PPM TAPE STIFF ASSY)	JUN78/JUN78	JUL78/JUL78	M
433876	PROTOS & NCN COMPLTE	AUG78/JUL78	OCT78/JUL78	M
433876	PROTOS COMPLETE	OCT78/AUG78	JUL80/	M
433876	INSTALL COMPLETE	AUG80/	SEP80/	M
433876	TDP/DOF M/ FINAL OPT COMPLETE	MAY79/	SEP79/	(DEL) M
433876	WORK COMPLETE	JUN78/JUN78	MAY80/	(DEL) M
433876	PROTO ACCEPT AT GNC	OCT80/	NOV80/	(ADD) M
433876	FISCAL OBLIGATION (900PPM TAPE STIFF ASSY)	FEB76/MAY76	FE876/MAY76	M
433876	CONCEPT STUDY FOR SOW	APR76/AUG76	APR76/AUG76	M
433876	CONCEPT STUDY FOR ADVERFORBIDS	APR76/SEP76	APR76/OCT76	M
433876	CONCEPT STUDY INITIATED CONTRACT AWARD	JUN76/SEP77	AUG76/SEP77	M
433876	FEASDSW V/ PROCCOMPL	AUG76/NOV77	AUG76/NOV77	M
433876	FEASEQUIP/PROCCOMPL	AUG76/NOV77	JAN77/FEB78	M
433876	FEASTEST COMPL	APR78/FEB78	JUN78/	M
433876	PROTOS & NCN COMPL	MAY79/	NOV79/	M
433876	PROTO COMPL	AUG79/	MAR80/	M
433876	INSTALL COMPL	MAR80/	MAY80/	M
433876	TDP/DOF M/ FINAL OPT RELEASED	MAR80/	MAY80/	M
433876	WORK COMPL	MAY80/	JUN80/	M
433876	FISCAL OBLIGATION (AUTOGRENADE MACH)	FEB76/MAY76	FE876/MAY76	(DEL) M
433876	CONCEPT STUDY FOR SOW	APR76/AUG76	APR76/AUG76	(DEL) M
433876	CONCEPT STUDY FOR ADVERFORBIDS	APR76/SEP76	APR76/OCT76	(DEL) M
433876	CONCEPT STUDY INITIATED CONTRACT AWARD	JUN76/SEP77	AUG76/SEP77	(DEL) M
433876	FEASDSW V/ PROCCOMPL	AUG76/NOV77	AUG76/NOV77	(DEL) M
433876	FEASEQUIP/PROCCOMPL	AUG76/NOV77	JAN77/FEB78	(DEL) M
433876	FEASTEST COMPL	JAN77/FEB78	APR78/	(DEL) M
433876	PROTOS & NCN COMPL	APR77/MAY78	JUN77/	(DEL) M
433876	PROTO COMPL	JUN77/	MAR78/	(DEL) M
433876	INSTALL COMPL	MAR78/	MAR78/	(DEL) M
433876	TDP/DOF M/ FINAL OPT COMPL	MAR78/	NOV78/	(DEL) M
433876	TOP/DOF M/ FINAL OPT RELEASED	NOV78/	JAN79/	(DEL) M
433876	WORK COMPL	JAN79/	SEP77/MAR79/	(DEL) M
433876	FINAL RPT	DEC80/	(ADD) M	
434177	CONTRACT AWARD	JAN77/APR77	JAN77/APR77	E
434177	MARKETS & PROF. OF PROC + EQUIP	MAR77/MAR77	MAY77/JAN78	E
434177	INTERIM LRPT	MAY77/MAY77	MAY77/MAY77	(ADD) E
434177	BENCH SCALE TEST DYS	JUN77/JUN77	OCT77/MAR79	E
434177	ECOSTUDY OF PROC + EQUIP	AUG77/AUG77	NOV77/APR78	E
434177	HAZARD ANAL	JUL77/JUL77	DEC77/MAR79	E

434177	PRELIMSELFOFEQUTP	OCT77/OCT77JAN78/FEB78
434177	INTERIMLTRRPT	DEC77/DEC77DEC77/FEB78
434177	FINALRPT	MAR79/MAR79 MAR79/MAR79
434178	PROCOFEQUIP	SEP80/AUG79AUG80/
434178	HAZARDOSANAL	MAY79/APR79FEB81/
434178	SELFOFEQUP	SEP79/SEP79 JAN80/MAR80
434178	FINALSTATUSRPT	DEC80/ DEC80/
434178	PRODASSURANCE	OCT79/OCT79FEB81/
434179	INSTALLOFPROCEDUPIP	SEP79/MAR80OCT80/
434179	CNTLSYSTDEV	DEC79/FEB80FEB81/
434179	EQUIPCHECKOUT	SEP80/ DEC80/
434179	FINALSTATUSRPT	JUN81/ JUN81/
434180	EVALOFPROCEDUPIP	JAN81/ JUN81/
434180	FINALSTATUSRPT	DEC81/ DEC81/
434181	FINALSTATUSRPT	JUN82/ JUN82/
434181	FINALTECHART	OCT81/ MAR82/
434377	FUNDSTRANSTOGOCO	MAR77/MAR77JUL77/OCT77
434377	EVALOFPROCNTLPARAMETERS	OCT77/OCT77SEP79/SEP79
434378	FINALRPT	APR79/MAY79OCT79/MAR80
434378	LIT+CNTLRECEXAM	OCT77/OCT77AUG78/SEP78
434378	FINALSTATUSRPT	APR77/APR77APR77/APR80
434378	FINALTECHART	JAN80/APR80JUN80/
436277	PROCINVESTIGATION	JUN77/JUN77AUG77/AUG77
436277	EQUIPPROCUREMENT	JUN77/JUN77SEP77/JAN78
436277	CONTLCUDLPROCDFY	DEC77/FEB78JUL80/
436277	BASELINEDESGNCRITERIA	JUN77/DEC77FEB79/FEB79
436277	FINALRPT	JUL79/JUL79 DEC80/
436277	FINAL3J1RPT	DEC80/ JAN81/ (ADD)
441077	SINTERTOSHAPENAMETAL	NOV76/MAY77APR77/JUL77
441077	SINTERTOSHAPETFLEDYNE	NOV76/APR77APR77/MAY77
441077	EVALTWUSTFPWAGEKENNAMETAL	NOV76/APR77JAN77/NOV77
441077	EVALONESTPSWAGEKENNAMETAL	MAY77/MAY77SEP77/NOV77
441077	EVALVARIEDDIESWAGETELEDYNE	FEB77/JUL77JAN78/FEB78
441077	FINALEVALSTEPSWAGE	DEC77/DEC77AUG79/AUG79
441077	FINALEVALVARIEDSWAGE	JAN78/FEB78SEP79/SEP79
441077	FINALRPT	SEP79/MAY79OCT79/DEC79(ADD)
443177	AWARDCONTRACT	JAN77/JAN77JUN77/NOV77
443177	CONCEPT/DSGNEQUIP	SEP77/NOV77AUG78/MAR79
443177	RUILDEQUIP	OCT78/OCT78JUN78/
443178	AWARDCONTRACTPHASE3+4	NOV77/JUL78JAN78/SEP78
443178	TESTEQUIP(CONTD)	JUL78/MAY79AUG79/
443178	SHIP+INSTALLEQUIPATMAAP	SEP78/MAY79OCT78/
443178	INERT+LIVETESTCATMAAP	NOV78/ DEC78/
443178	TDF+JMP	APR78/OCT78DEC78/
443178	SUBMITFINALRPT	JAN79/JAN80FEB79/JAN80
443178	FINALIZETOP	JAN79/ FEB79/
444477	PROJAPPROVAL	JUL76/AUG76JUL76/AUG76
444477	FISCALOBIGATION	JUL76/AUG76JUL76/AUG76
444477	SCCPEOFWORK	MAY76/MAY76MAY76/MAY76
444477	AOFORBIUS	OCT76/OCT76DEC76/DEC76
444477	CONTRACTAWARD	FEB77/APR77FEB77/APR77
444477	CONCEPTSTUDY	APR77/MAY77SEP77/SEP77
444477	CONCEPTPREVIEW	SEP77/SEP77OCT77/OCT77
444477	FINALRPT	/MAY80
444478	PROGAUTH	JAN78/JAN78JAN78/JAN78
444478	FISCALOBIGATION	JAN78/JAN78JAN78/JAN78
444478	SELECTBESTAPPROMACH	AU77/AUG78SEP78/OCT78
444478	DEVPROCPKG	NOV78/MAR77DEC78/MAY79
444478	CONTRACTAWARD	JAN78/JUN79JUN80/
444478	ESTABPILOTLINE	MAR78/ AUG78/ (DEL) M
444478	MFGBODIES	OCT78/ JUN79/ (DEL) M
444479	PROGAUTH	JUL79/SEP78JUL79/ (DEL) M
444479	FISCALOBIGATION	SEP78/SEP78NOV78/DEC78
444479	LAPROJS	FEB82/ MAR82/
444479	PRCJBALLISTICTESTS	APR82/ JUL82/
444479	EVALRESULTS	JUL82/ SEP82/ M

444479	PERFORM LOCAL TESTS	JUL79/	SEP79/	(DEL)	M
444479	A/E/D/TUP	APR80/	MAY80/	(DEL)	M
444479	SURVEILLANCE	MAY80/	SEP80/	(DEL)	M
444479	FINAL RPT	SEP81/	OCT81/		M
444478	TDPTUPROC	MAY79/MAY79 MAY79/JUN79			
444478	PREP OF CONTR DWG	JUL80/	NOV80/		M
444478	APPRV OF DWSHBYARRADCOM	NOV80/	DEC80/		M
444478	FABOP 20-HOY	JAN81/	MAY81/		M
444478	TESI EVAL 270RDY	JUN81/	SEP81/		M
444478	FABOP 17/109HDY	OCT81/	DEC81/		M
444478	ACCEPTUFRD(YBYARRADCOM	DEC81/	JAN82/		M
444478	FINAL RPT	FEB82/			
444479	LAPATL SAAP COMPLETE	MAR81/			M
444479	HALLISTIC COMPLETE	JUN81/			M
444479	FINAL RTP-TECH	SEP82/	OCT82/		M
444479	FINAL RTP-3/1	OCT82/	OCT82/		M
444778	LITSEARCH	MAR78/MAR78 APR78/APR78			
444778	EVA-SCLUFALTS	MAY78/MAY78 FEB79/APR79			
444778	DEV-ADJUST OF HT4DS-CNTLS	JUL78/JUL78 APR79/SEP79			
444778	RPT	APR79/SEP79 SEP80/			
444778	DEV OF IC METHOD	JAN80/JAN80 AUG80/ (ADD)			
444978	FINAL TECH RPT	OCT78/NOV78 OCT78/NOV78			
444978	TESTLOT IFG(2TFSTLOTS)	APR79/APR79 MAY79/APR79			
444978	EXTRUDE 2 TESTLOTS	MAY79/APR79 JUN79/APR79			
444978	EVAL2TESTLOTS	JUN79/APR79 AUG79/APR79			
444978	TEST (END)ITEMS	AUG79/OCT79 OCT79/NOV79			
444978	FINAL RPT (2TESTLOTS)	JAN78/ OCT77/			
444978	PILOT PLANT TENGRSIGN	APR79/	AUG79/	(DEL)	M
444978	HAZARDS ANAL	APR79/	JUN79/	(DEL)	M
444978	FOLIPROJC	APR79/	JUL79/	(DEL)	M
444978	SITE PRLP-EQUIP INSTALL	APR79/	JUL79/	(DEL)	M
444978	OPER TRAINING	APR79/	JUL79/	(DEL)	M
444978	EQUIP TEST	AUG79/	OCT79/	(DEL)	M
444978	PHCCEVAL	NOV79/	APR80/	(DEL)	M
444978	ECCEVAL	FEB80/	MAY80/	(DEL)	M
444978	FINAL RPT	FEB80/	FEB80/JUL80/		M
444978	MFGRADUATESTLOTS	JUN79/NOV79 JUL79/NOV79	(ADD)		M
444978	EXTRUDE ADU TESTLOTS	JUL79/DEC79 AUG79/DEC79	(ADD)		M
444978	EVALADUTESTLOTS	AUG79/DEC79 OCT79/DEC79	(ADD)		M
444978	FINAL RPT (ADU TESTLOTS)	DEC79/DEC79 JUL80/	(ADD)		M
445777	FUNDRECVDARRADCOM	/AUG76 (ADD)			
445777	FUNDRECVDIAAP	JUL76/AUG76			
445777	POXARUS	AUG76/OCT76 FEB77/FEB77			
445777	MATERIAL RECVD	NOV76/NOV76 JUL77/SEP77 (ADD)			
445777	FABRICATION	SEP76/NOV76 MAY77/MAY77			
445777	MACMASSY	JAN77/MAR77 JUN77/AUG78			
445777	DEEUG	MAY77/HAY77 JUL77/OCT78			
445777	TEST	AUG77/NOV78 AUG77/NOV78			
445777	FINAL RPT	SEP77/JAN79 OCT77/AUG79			
445777	PROCPMU	SEP77/	OCT77/	(DEL)	M
446179	DEVALAN-CONTLCITERIA	JAN79/JAN79	SEP79/SEP79		M
446179	PROCD DELIVERY OF INSTRUMENTATION	OCT79/	MAY80/	(DEL)	M
446179	INSTALL OF INSTRUMENTATION	JUN80/	JUL80/	(DEL)	M
446179	HAZARD ANAL	JUN80/	SEP80/		M
446179	EVAL INSTRUMENTATION	JUL80/	NOV80/	(DEL)	M
446179	FINAL RPT	JUN80/	SEP80/		M
446179	COMPUTATION CONCEPTSYS	JAN79/JAN79	SEP79/SEP79	(ADD)	M
446179	EVALUATION SEL CONCEPTSYS	SEP79/SEP79	JAN80/APR80/APR80	(ADD)	M
446179	DEV ANAL ACNTPROCSYST	JAN80/APR80/JUN80/	(ADD)		M
446179	PREPRUCCSCOPE FOR ANAL EQUIP	JUN80/	SEP80/	(ADD)	M
446179	FINAL BURROT	JUN80/	SEP80/		M
446277	ENGNUATAMIV	AUG77/AUG77 MAY78/MAY78			
446277	LAB-BENCHSCALFDYS	OCT77/SEP77 MAY78/MAY78			
446277	HAZARDOS ANALYSTS	MAR78/APR78 MAY78/JUL78			
446278	ENGRSTUDYS	SEP78/SEP78 JUL80/			
446278	HAZARD ANAL II	SEP78/SEP78 DEC79/DEC79			

446278	EQUIPPROCFORFADBAYMOD	OCT78/OCT78MAY79/DEC79	
446278	BLDGMD	NOV78/NOV78JUN79/MAR80	
446278	PROCNNGSCRUBBERTANKS+PUMPS	FEB79/FEB79AUG80/	
446278	SUBMITABSORBERDSGN+DWGS	MAY79/MAY79JUN80/	
446278	DATAACQUISEQUTB	OCT78/OCT78FEB79/DEC79	
446278	EVALOFMODFADBAY	APR80/APR80JUL80/	
446279	HAZARDANAL	JUL79/OCT79SEP80/	(ADD)
446279	COMPLSOLVENTABSORBDGN	AUG79/MAR80JUN80/	
446279	PROCOFSOLVENTABSORBDGN	MAR80/ SEP80/	(ADD)
446279	INITPROCOFSOLVENTABSORBER	AUG79/AUG79JUL80/	(ADD)
446279	SITEPREPINSTALLOFGNSCRUBBERTANKS+NGHOUJAN80/JAN80SEP80/	(ADD)	
446279	EVALNGSCRUBBER+NGMONITOR	SEP80/ NOV80/	(ADD)
446279	DATAACQUIS+PRELIMINSTRUDSGNFORFADCOM	DEC79/DEC79NOV80/	(ADD)
446279	HEATPIPESTUDY	DEC79/DEC79APR80/APR80	
446280	HAZARDSANALYSTRIV(4)	AU80/ OCT81/	(ADD)
446280	PROCOFSOLVENTABSORB	JUN80/ DEC80/	(ADD)
446280	INSTALLSOLVENTABSORB	JAN81/ APR81/	(ADD)
446280	EVALFADBAYW/NGSCRUBBER	APR81/ JUL81/	(ADD)
446280	FACILITYDESOCRITERIA	FE881/ OCT80/	(ADD)
446280	DOCFINALRPT	JUL81/ APR82/	(ADD)
446280	DATAACQUAPRELIMINSTDSGNCONCPADII	MAY81/ SEP81/	(ADD)
446280	FINALTECHRPT	JUL81/ APR82/	
446280	FINAL30IRPT	JUN82/ JUN82/	
446678	STUDYEXISTMETHODSOFTNTLDG	FEB78/FEB78APR78/APR78	
446678	STUDYINSTRUMENTATION	FEB78/FEB78MAY78/MAY78	
446678	MODAUTUMELTSYST	DEC79/ JAN80/	
446678	PROCTNTDOCTOL+CVCLOTOOL	APR78/APR78FEB78/FEB80	
446678	INSTALLINSTRUMENTATION	JUL78/NOV78AUG78/FEB79	
446678	PILUTLINETEST	AU78/MAY80FEB78/MAY80	
446678	TECHRPT(INTERIM)	FE880/ MAR80/	
446679	DSGNSPECMSXINGASYST	JAN79/JAN79MAR79/MAR79	
446679	PROCUREMIXINGSYST	MAR79/FEB79DEC80/	
446679	HAZARDSANALYSIS	NOV79/NOV79JUN80/	
446679	INSTALLMIXINGSYST	JAN81/ APR81/	
446679	PROTOTEST	MAY81/ AUG81/	
446679	FINALTECHRPT	AUG81/ NOV81/	
446678	FINAL30TRPT	SEP80/	
446679	FINAL301RPT	JUN81/	
446978	PROGRAMAUTHORIZATION	NOV77/JAN78NOV77/JAN78	
446978	AWARDPHASE1CONTRACTFORM483	FEB78/FEB78JUL78/JUL78	
446978	CONCEPT+FEASSTUDIES	JUL78/JUL78OCT78/	(DEL)
446978	DSGNPROTOFORM483	OCT78/ APR79/	(DEL)
446979	REVCOPIESOFWORKDUALCAPABILITY	JAN79/JAN79FEB79/FEB79(ADD)	
446978	DSGNABUILDINSERVICE	OCT78/OCT78SEP79/SEP79	
446978	PROGRAMAUTHORIZATION	DEC78/MAY79DEC78/MAY79	
446979	AWARDCONTRACT	MAY79/MAY79SEP79/SEP79(ADD)	
446979	AWARDPHASE2CONTRACTFORM483+M509	DEC78/ APR79/	(DEL)
446979	CONCEPT+FEASSTUDIESFORM509	MAY79/ JUL79/	(DEL)
446979	BUILDPROTOEQUITIFORM483	APR79/ OCT79/	(DEL)
446979	DSGNPROTOFORM483	JUL79/ JAN80/	(DEL)
446979	BUILDPHOTOFORM609	JAN80/ JUN80/	(DEL)
446979	INSTALL+ACCEPTTESTEQUIPFORM483+M509	JUL80/ SEP80/	(DEL)
446979	COMPLTUP/DOFM+FINALRPT	JUL80/ OCT80/	(DEL)
446979	DSGN+BUILDCONCEPTMODELS	SEP79/SEP79JUL80/	(ADD)
446979	DEBUG+EVALCONCPFTMODELS	DEC79/OCT79AUG80/	(ADD)
446979	DSGNABUILDSYSproto	FEB80/SEP79MAR81/	(ADD)
446980	RECVDFUNDS	NOV79/NOV79NOV79/NOV79(ADD)	
446980	BUILDSYSTproto/DUAL	NOV79/ MAY80/	(DEL)
446980	DEBUGPHOTO/W/INSERT	SEP80/ MAY81/	(ADD)
446980	SHIP+INSTALL+GOCO	JAN81/ JUN81/	(ADD)
446980	DEBUG+SHAKEDOWN/W/HE	FEB81/ JUL81/	(ADD)
446980	ACCEPTA+GOCOW/HE	MAR81/ AUG81/	(ADD)
446980	TDPFORREPPLICATES	JUN81/ SEP81/	(ADD)
446980	FINALRPT	APR81/ SEP81/	(ADD)
447278	RECPTOFFFUNDS	OCT77/DEC77	
447278	CONTRACTAWARD	JAN78/JAN78JUL78/AUG78(ADD)	E

447278	FEASSTUDYOFALTFRUNDERCONSIDERATION	OCT77/AUG78MAY78/JAN79	E
447278	DETEROFBESTAPPROACHFORHAGFAB	JUN78/JAN79JUL78/JAN79	E
447278	DEVSLECTCONCET	APR79/MAY79JUL79/JUL79	(ADD) E
447278	PREPARESCOPEOFWORK	FEB79/FEB79DEC79/	(DEL) E
447278	JURYRIGTEST	MAR79/APR79JUL79/JUL79(ADD)	E
447278	FINALTECHRPT		
447278	FINAL301RPT	JUN80/JUN80	E
447479	ENGRSTUDYSAMARKETSURVEY	MAY79/SEPT79 JUL80/	E
447479	LAB/BENCHSCALFCTDY	JAN80/JAN80JUL80/	E
447479	HAZARDANAL	JAN80/JAN80JUL80/	E
447479	FINALRPT	JUL80/ AUG80/	E
448177	ENGRANALOFPYTHONYSISSYST	SEP77/SEP77AUG78/AUG78	E
448179	SELECTCNTR+ISSUECONTRACT	DEC78/ APR79/	E
448179	USENOFPILOTPLANT	MAY79/ OCT79/	E
448179,BU	PURCHASEEQUIP	NOV79/ MAR80/	E
448180	INSTALLPILOTPLANT	APR80/ AUG80/	E
448180	EVALPILOTPLANT	SEP80/ JAN81/	E
448180	FINALRPT	FEB81/ MAR81/	E
449878	CONDUCTSTUDYPPNGRAM	MAR78/MAR78MAY78/MAY78	E
449H78	FEASSTUDY	SEP78/SEP78DEC78/FEB79	E
449078,79	USGNEQUIP	SEP78/SEP78JAN81/	E
449H78	FA&+INSTALLEQUTP	MAR79/ SEP80/ (DEL) M	E
449H79,BU	FABLWUUP	MAR80/MAR80APR81/ (ADD) M	E
449H79,80	INSTALLEQUIP	JUL80/ MAY81/ (ADD) M	E
449880	DEBUGUEQUIP	JUL80/ JUN81/	E
449880	FINALRPT	DEC80/ DEC80/	E
449H78	FINALRPT3&1	SEP80/ SEP80/ (ADD) M	E
449H79	FINAL301RPT	SEP81/ SEP81/ (ADD) M	E
449880	FINAL301RPT	DEC81/ DEC81/	E
450H78	FNGRDATACOMPL	DEC78/OCT78JAN78/JAN79	E
450878	EVALCOATTECHS	JAN78/JAN79MAY78/MAY79	E
450H78	HAZARDANAL	MAY79/MAY79SEP79/MAY80 (ADD) E	E
450878,79	PILOTPLANTSGNCRIT+DSGN	JAN79/JAN79SEP80/	E
450878	FINALRPTFY78	NOV79/ DEC80/	E
450879	ENCLOUDER+DISCHARGE(A7)	FEB79/FEB79APR79/MAR79	E
450879	COVERPHOTOCELL+ORTS(A7)	FEB79/FFB79FE879/FEB79	E
450879	INSTALLMAKEUPATRSYST(A7)	FEB79/FEB79FE879/FEB79	E
450H79	INSTALLATRESLIQDRYSYST(A7)	FEB79/FEB79MAY79/MAY79	E
450H79	INSTALLWASH+SCIDUHWATERSYSTS(A7)	MAR79/FEB79JUN79/MAY79	E
450H79	DEVCONTLSYST(A7)	JUN79/FEB79AUG79/MAY79	E
450H79	EVALMOU(A7)	JUN79/MAY79AUG79/MAY79	E
450H79	FINALRPT(A7)	JUN79/JUN79SEP79/AUG79	E
450879	INSTALLWSSMONTTURBODRYER	NOV80/ MAR81/ (ADD) E	E
450H79	FINALRPTFY79	MAR81/ MAY81/	E
450H80	HAZARDANALINFO	MAY80/MAR80MAR81/	E
450F80	EIMCUFLTFRENGDSGN	SEP80/ JAN81/	E
450F80	EIMCOFLTFRINSTALL	FEB81/ JUN81/	E
450H80	COATINGEVALA3+44	SEP80/ DEC80/	E
450H80	EIMCOENVIDTEST	JUL81/ AUG81/	E
450H80	EIMCUFLTCREVAL	SEP81/ JAN82/	E
450H80	FINALRPTFY80	DEC81/ APR82/	E
621174	MATLPHUS	JUL73/SEP73SEP73/OCT73	Q
621174	PREFORMUSGN	JUL73/SEP73OCT73/DEC73	Q
621174	PRCCENGD	OCT73/OCT73MAY74/MAR74	Q
621174	FAEPROTOPREFOR'S	JAN74/JAN74JUN74/JUN74	Q
621174	PRCUOFM49A280DNTS	APR74/APR74JUN74/SEP74	Q
621174	HALLISTICTEST+FVAL	JUL74/OCT74DEC74/NOV75	Q
621175	OPTOPMATAL	NOV74/NOV74FEB75/AUG75	Q
621175	OPTOPPREFORMUSGN	NOV74/NOV74FEB75/AUG75	Q
621175	FABOPP+TOOLS	JUN75/JUN75AUG75/AUG75(ADD) Q	Q
621175	MOCOFFURMTOOLS	JUN75/JUN75OCT75/NOV75(ADD) Q	Q
621175	FABOPP+PREFORM'S	SEP75/OCT75OCT75/NOV75(ADD) Q	Q
621175	FABXM72 BODIES	OCT75/OCT75MAY76/MAR76(ADD) Q	Q
621175	TECHRPT(COLDPPNC)	JAN76/FEB76MAY80/ (ADD) Q	Q
621175	FABPREFORMS	NOV76/APR77JUN77/MAY77(ADD) Q	Q
621175	FAEMCCCHDRIES	MAR77/MAY77JUL77/JUN77(ADD) Q	Q

621175	PITTEST	JUN77/NOV77OCT77/NOV78(ADD)	Q
621175	PANELTEST	JUL77/OCT77OCT77/MAR78(ADD)	Q
621175	TECMRPT(HCCCPROC)	FEB78/MAY78JUN80/(ADD)	Q
647776	FUND\$RECD	NOV75/OCT75NOV75/OCT75	M
647776	FEASSTDYSCOPEOFWORK	FEB76/FEB76APR76/APR76	M
647776	CNTRAWARD	APR76/MAY77JUN76/SEP77	M
647776	FEASDSN	JUN76/AUG76/(DEL)	M
647776	FEASDSG1/PROCSTDY	OCT77/OCT77FEB79/JAN79(ADD)	M
647776	FEASTESTS	MAR78/MAR78JUN80/	M
647776	APPVL0FSELDSGN/PROC	MAY80/MAY80JUN80/	M
647776	APBIDSPROTO	JAN77/FEB77/(DEL)	M
647776	CONTAWARUPROTO	FEB77/MAR77/(DEL)	M
647776	PRCTODSGN	MAR77/MAY77/(DEL)	M
647776	PROTUFAB	APR77/JUL77/(DEL)	M
647776	PROTOSTEST	AUG77/NOV77/(DEL)	M
647776	PROTOACCEPT	OCT77/NOV77/(DEL)	M
647776	TDP	MAY80/MAY80JUL80/	M
647776	FINALRPT	AUG80/SEP80/	M
655373	FINALRPT	/SEP76	M
655374	FINALRPT	/SEP76	M
655377	FINALRPT	/JUN78	M
655379	AUTHFUNDS	MAY79/MAY79JUN79/JUN79	M
655379	PHEPCOORDSTPLAN	JUN79/MAY79JUN79/JUN79	M
655379	CONTRACTSCOPPROFWORK	JUL79/JUL79JUL79/JUL79	M
655379	AWARDUCONTRACT	AUG79/AUG79SEP79/NON79	M
655379	FRABTSISTO	OCT79/JAN80OCT79/MAR80	M
655379	PREPOPINSTACAI PROC	OCT79/AUG79OCT79/MAR80	M
655379	REALTACALRACOUSTICINSPSYS	OCT79/MAR80OCT79/MAR80	M
655379	PREFORMPROBLINTST	NOV79/APR80NOV79/APR80	M
655379	EVL^APPNOVEAISTSTMETHODUA	JAN80/JAN80JAN80/APR80	M
655379	PREPAISOPERAMINTMANUAL	JAN80/JAN80/	M
655379	PREPPURCHASEDFCRFORAIS	JAN80/JAN80/	M
655379	APPVUTESTSTD5	JAN80/JAN80/	M
655379	EVALTESTRESULTS	JAN80/MAR80/APR80JUN80/	M
655379	FINALAISOPERAMINTMANUAL	JUL80/JUL80/	M
655379	PREPREWIDESFORATS	JUL80/JUL80/	M
655379	FINALTECHRPT	AUG80/AUG80/	M
655474	FINALRPT	/ /JUN76	N
655475	FUNDING	JUL74/OCT74DEC74/JAN75	N
655475	SCOPE	OCT74/DEC74JAN75/FEB75	N
655475	PROCACTION	FEB75/FEB75FEB75/OCT75	N
655475	CONTEXECUTE	MAY75/OCT75MAY75/JUL79	N
655475	EQUPINSTALL+HWRPREP	SEP75/NOV75NOV75/DEC75	N
655475	TEST+EVAL	NOV75/DEC75FEB76/MAY77	N
655475	FINALRPT	AUG76/AUG77JUN80/DEC79	N
655475	AJARUCUNTPACT	/JUN78AUG78/SEP78	M
662578	PHASEII-ISTRMTOFINERTIAWELDER	SEP78/OCT78DEC78/	M
662578	MEASUFPCRTWELDARA	DEC78/ JUN79/	M
662578	PHASEIIIAQUISOFSYSTCNTLHDWR	JUN79/ SEP79/	M
662578	DEVSOFTRAREFOR+DAPTHACHCNTL	SEP79/ FEB80/	M
662578	FINALRPT	MAR80/ APR80/	M
662876	FUNDING	OCT75/OCT75OCT75/OCT75	N
662876	PREPSCUPE/AUDFORBIDS	JUN75/JUN75OCT75/OCT75	N
662876	CONTAWARD	/ JAN76/MAR76	N
662876	DSN	FEB76/APR76MAY76/AUG76	N
662876	FAB	MAY76/AUG76OCT76/SEP79	N
662876	ACCEPTTEST	OCT76/ NOV76/	N
662876	TDP	AUG77/AUG77JUN80/	N
662876	FINALRPT	MAY79/MAY79JUN80/	N
662876	DEMOHS77CONTMOD	DEC78/DEC78JAN79/MAR79	N
662876	DEMO(FEAS)TEST	MAR79/APR79MAR79/FEB80	N
662876	EVALREDESIGNRT	JUN79/ JAN80/	N
662876	INCRCO+IFUNDS+MOD	JUL79/ SEP79/ (DELIN)	N
664076	CONTPROC	NOV75/NOV75MAR76/APR76	Q
664076	PROD0F60%LINERS	MAR76/AUG76AUG76/FEB77	Q
664076	PRELIMTESTONLINERS	APR76/SEP76NOV76/FEB77	Q

664076	X-RAY TESTS OF SAMPLE LINERS	APR76/SEP76 NOV76/FE877	Q
664076	STATIC BALLISTIC & FLASH X-RAY TESTS	APR76/SEP76 SEP76/FE877	Q
664076	COMPOF RESULTS	SEP76/JAN77 NOV76/SEP77	Q
664076	INTERIM TECH RPT	JAN78/JUN78 MAR78/ (DEL) Q	
664077	ANALOF TEXTURE & APS PROUINFY76	OCT76/MAR77 DEC76/OCT77	Q
664077	QUANT TEXTURE INDICES CHAR	JAN77/JUN77 MAR77/OCT77	Q
664077	PROD OF EXPER CHAMBER LAIN LINERS	FEB77/FEB77 MAY77/MAY77 (ADD) Q	
664077	X-RAY TEST OF ARMOVEL LINERS	NOV76/NOV76 JUN77/JUL77 (ADD) Q	
664077	COMP TEXTURE STATIC BALLISTIC & XRAY RES	APR77/JUL77 JUN77/JUN78	Q
664077	PREPPROCK FOR PRECLINERS	OCT77/OCT77 JAN78/DEC77 (ADD) Q	
664077	AWARD CONT	JUN77/DEC77 AUG77/FEB78 (ADD) Q	
664077	PROD OF PRECISION LINERS	AUG77/MAR78 OCT79/MAY80 (ADD) Q	
664077	X-RAY & BALLISTIC TESTS OF PRECLINERS	NOV78/DEC78 JUL80/ (ADD) Q	
664077	IDENT & SEL OF MF&PROC	APR77/SEP77 AUG80/	Q
664077	COMP OF TOP	JAN79/OCT79 SEP80/	Q
664077	PREPOFFINAL TECH RPT	JAN79/MAY80 OCT80/	Q
663476	RECEIPT OF FUNDS (TASKA)	DEC75/DEC75 DEC75/DEC75	M
663476	PLACE CONTRACT FOR FORM STUDIES	OCT75/OCT75 JAN76/ (DEL) M	
663476	CONDUCT FORM STUDIES	FEB76/ JUL76/ (DEL) M	
663476	REDIRECTE FORT	FEB76/FEB76 MAR76/MAR76 (ADD) M	
663476	CONDUCT RECYCLING STUDY	APR76/APR76 JUN77/JUN77 (ADD) M	
663476	HALLISTIC TESTS	JUL79/JUL79 OCT79/SEP79 (ADD) M	
663476	COMPLETE RECYCLING STUDY	SEP77/SEP77 OCT77/NOV78 (ADD) M	
663476	FINAL REPORT	SEP79/SEP79 SEP80/ (ADD) M	
663476	RECEIPT OF FUNDS (TASKB)	NOV75/NOV75 NOV75/NOV75	M
663476	TRANSFUND STOBRI	NOV75/NOV75 DEC75/DEC75	M
663476	CHEM-SWAG VAL	DEC75/DEC75 FEB76/APR76	M
663476	SIMI ERINGE VAL	DEC75/JAN76 MAR76/MAY76	M
663476	HEAT TREAT E VAL	JAN76/FEB76 APR76/JUN76	M
663476	HOT & SO STATIC CPRESSE VAL	JAN76/FEB76 MAY76/JUN76	M
663476	XH735 EVAL LOTN01	FEB76/APR76 MAY76/JUN76	M
663476	X735 EVAL LOTN02	MAR76/JUN76 AUG76/SEP76	M
663476	DESCRIPT OF MF&G	FEB76/APR76 DEC76/MAY77	M
663476	FINAL RPT	AUG77/SEP77 SEP80/	M
663477	SELECT & OPTIMIZE PROC	JUL76/ AUG76/ (DEL) M	
663477	FAECUCURE SOF EACH ALLOY	SEP76/ NOV76/ (DEL) M	
663477	INSPECT & TEST CORES	NOV76/ DEC76/ (DEL) M	
663477	RECEIVE FUNDS (T-SKC)	SEP76/JAN77 SEP76/JAN77	M
663477	PLACE CÔTRACTS	SEP76/SEP76 JUL77/JUL77	M
663477	ACTIVATE ROLLING FACILITY	MAY76/MAY76 JUL77/AUG77	M
663477	PRODUCER ODS	AUG77/AUG77 JAN78/MAR78	M
663477	PRODUCES TAB ALLOY	AUG77/AUG77 JAN78/JUN78	M
663477	PLACE CÔTRACT FOR FORM STUDY (TASKD)	JAN78/JUN78 OCT78/OCT78	M
663477	UEVPROC	FEB79/FEB79 JUN79/JUN79	M
663477	F1B PENETRATORS	AUG79/AUG79 MAY80/MAY80 (ADD) M	
663477	PHEP FINAL RPT FOR FORM STUDY	JUN79/ JUN79 (DEL) M	
663477	HALLISTIC TEST	MAY78/MAY78 MAY79/MAY79	M
663478	CONDUCT CHIP STUDIES	FEB79/FEB79 MAY79/APR79	M
663478	CONFIRMATORY HALLISTIC STUDY	JUN79/JUN79 AUG80/	M
663478	FINAL RPT	OCT78/JUN79 AUG80/	M
663478	FINAL RPT-301	OCT78/ NOV78/ (DEL) M	
663479	CASTINGOTS	JAN79/ MAY79/ (DEL) M	
663479	FA PROD QUANTITY	FEB79/FEB79 JUN80/ (ADD) M	
663479	PLACE CÔTRACT FOR CHIP CYCLE	JUN80/ JUN81/ (ADD) M	
663479	CONDUCT CHIP CYCLE EFFORT	JAN80/JAN80 JUL80/ (ADD) M	
663479	EVAL PROD HEAT TREAT PROC	NOV80/ DEC80/ (ADD) M	
663479	FAB PEN THATORS	FEB81/ FEB81/ (ADD) M	
663479	HALLISTIC TEST	MAR81/ APR81/	M
663479	FINAL RPT	JUN81/ JUN81/	M
663479	FINAL RPT (301)	OCT75/OCT75 NOV75/NOV75	Q
664076	PREPCONT WORKSCOPE	AUG81/ AUG81/	M
673880	FINAL 301 RPT	OCT75/OCT75 OCT75/OCT75	M
664276	HCCPT OF FUNDS	OCT75/OCT75 JAN76/MAR76	M
664276	AWARD OF CONTRACT	JAN76/APR76 MAY76/AUG76	M
664276	PERFORM STUDIES	APR76/OCT76 JAN77/OCT77	M
664276	WELODANOSON PROJECTILES		

664276	ESTABNUTPROCEDURE	APR76/APR76DEC76/SEPT6	M
664276	BALLISTICTESTS	MAY76/MAY77DEC76/FEB78	M
664276	FINALRPT	DEC77/DFC77MAY79/JUN79	M
667877	PREPENHRSCOPEOFWORK	SEP76/SEP76SEP76/SEPT6	M
667877	AWARDUANT	FEB77/FFB77JUN77/SEP77	M
667877	CONDSTUY155MMM107PROJ	JUL78/JUN78MAH79/MAY79	M
667877	CONDSTUY155MMM483PROJ	OCT77/OCT77JUL80/	M
667877	FINALRPT	APR78/MAY78MAH80/	M
667877	FINALRPT-301	APR78/MAY78SEP80/	M
667877	FINALTECHRTP	DEC80/ (ADD)	M
668178	FISCALURLIGATION(ROTARYFORGE)	OCT77/JAN78OCT77/JAN78	M
668178	USGNFAHTOOLING	JAN79/FFB79APR79/APR79	M
668178	PROCUREPREFORMS	APR78/APR78AUG78/AUG78	M
668178	CONDUCTFORGINGTRIALS	MAY79/MAY79JUN78/JUN79	M
668178	INSPHITARYFORGINGS	JUL78/AUG79JUL78/JAN80	M
668178	PHEPECUMONICANAL	JUL78/JAN80AUG78/FEB80	M
668178	WRITERFINALRPT	MAR80/ APR80/	M
668178	CONDUCTSURVEY	OCT77/JAN78DEC77/JAN78	M
668178	SELCEUMPFORINVEST	JAN78/JAN78JAN78/JAN78	M
668178	AWAKUCONTRACTFORINVEST	APR78/APR78SEP78/SEP78	M
668178	CONDUCTINVEST	SEP78/OCT78OCT78/FEB80	M
668178	PHEPECUMONICANAL	NOV78/FFB79DEC78/APR80	M
668178	WRITERFINALRPT	APR80/ MAY80/	M
668178	WRITERFINALRPT(201)	NOV79/MARAUJAN80/JUN80	M
668178	FINALTECHRTP	NOV79/JUN80AUG80/ (ADD)	M
668178	WRITERFINALRPT(201)SC	NOV79/MARRADEC79/APR80	M
668278	SELLINETOSESIMULATED	NOV79/MARRADEC79/MAY80 (ADD)	M
668278	ANALREQUIREMENTS	OCT78/DEC78NOV78/DEC78	M
668278	INVSIMULATION	NOV78/DFC78OCT78/DEC78	M
668278	DEBUG+TESTCOMPUTERIZESIMUL	JAN79/JAN79MAR79/ (DEL)	M
668278	CALIBROFCOMPUTERSIMUL	NOV79/NOV79JAN80/ (DEL)	M
668278	GGNLINF+DATACOLLECT	JAN80/ MAR80/ (DEL)	M
668278	SELECTSECONDLINETOBESIMUL	JUN79/JUN79AUG79/NOV79	M
668278	ANALREQUIREMENTS	MAR80/ MAY80/	M
668278	UEVSIMUL	MAY80/ JUL80/	M
668278	DEBUG+TESTSIMIII	JAN80/ MAR80/	M
668278	CALIBSI4UL	AUG80/ NOV80/	M
668278	USCBLINE+DATACOLLECT	NOV80/ DEC80/	M
668278	RPT	JUL80/ AUG80/	M
668377	SCALEMUDELPHCFNGR(XM791)	DEC80/ FEB81/	M
668377	PHOVPHOTOPENETATOR(XM791)	MAR77/MAR77MAY77/MAY77	QQ
668377	CHARDFMATLS(XM791)	MAY77/MAY77JUN77/JUN77	QQ
668377	BALLISTICFVAL (XM791)	JUN77/JUN77AUG77/FEB79	QQ
668377	ANAL+INTERIMRPT(XM791)	JUN77/JUN77AUG77/AUG77	QQ
668377	HIFMTODUE	SEP78/DEC78JUN79/AUG79	QQ
668377	PROCEENG+PROD	MAY78/JUL78JUL78/AUG78	QQ
668377	BALLISTICTEST+FVAL	AUG78/OCT78FFM79/FEB79	QQ
668377	ANALUATAINTERT+RPT	DEC78/JAN79JUL79/JUL79	QQ
668378	FINALRPT	JUL79/AUG79OCT79/DEC79	QQ
668378	CONTPILOTAPROD	DEC79/DEC79AUG80/ (ADD)	QQ
668378	PENETCHARACTER	NOV78/NOV78OCT79/NOV79	QQ
668378	SHALLSCALTBALLISTICTEST	NOV78/DEC78NOV79/DEC79	QQ
668378	BALLISTICTEST+FVAL	FFB79/FFB79JAN80/FEB80	QQ
668378	PROJCOMPIL	AUG79/AUG79JAN80/MAR80	QQ
668378	DOFMFINALRPT	DEC79/DEC79MAR80/	QQ
668378	DATAANAL	DEC79/DEC79AUG80/	QQ
668378	FINALRPT-301	DEC79/DEC79JUL80/ SEP80/	QQ
671476	ESTABSCOPOFOFCONT(NOSEOPER)	APR76/APR76APR76/APR76	M
671476	PLACEOFCONT(HTILETSEPT)	APR76/MAY76MAY76/JUN76	M
671476	ANALOFTTEMPFLOW.VEL	JUN76/AUG76JAN77/MAR77	M
671476	STRESSA1ALOFSHELL	SEP76/OCT76FEB77/APR78	M
671476	FAILUREANALOFSHELL	OCT76/NOV76FEM77/APR78	M
671476	FINALCUPROGOFNOSE	MAR77/JAN78MAH77/APR78	M
671476	PREPUFFINALRPT(NOSING)	MAR77/APR78APR77/MAY78	M
671477	PLACEOFCONT(HTILETSEPT)	OCT76/FFB77NOV76/APR77	M

671677	HEATPHLINTOSHFR	OCT76/APR77/MAR77/	(DEL) M
671677	METALEFLW-FRACTURE	DFC76/ MAY77/	(DEL) M
671677	OPTCOMPRPROGFORHILLETSPE	MAY77/ SEP77/	(DEL) M
671677	PREPOFHDTFURTHLETSEP	OCT77/ OCT77/	(DEL) M
671677	TUPICHTONHILLETSPETECHS	OCT77/APR77/OCT77/JAN78(ADD)	M
671677	WCFIOPMURKEFFRT	/AUG77/ /MAY78(ADD)	M
671677	REFINEDEFMATHMODFORDWG	JUN78/JUN78/JUN78/AUG78(ADD)	M
671677	CONFTESTOFMATHMODFORDWG	AUG78/SEP78/MAR79/APR79(ADD)	M
671677	PREMUFFINALRPTFORDWGCONFTEST	MAR79/APR79/APR79/MAY79(ADD)	M
671679	ESTMUSCIPROFWORK(INOSEPTERCECABRopers)	/SEP78/ /SEP78(ADD)	M
671679	PLACEOFCONT	FEB79/FFB79/JUN79/MAY79(ADD)	M
671679	CONFTESTOFMATHMODFORNUSING	JUL79/JUN79/JUL80/	(ADD) M
671679	DEVOFMATHMODFORPIERCABBB-BLOCK	JUL79/JUL79A/1680/	(ADD) M
671679	CONFTESTOFMATHMODFORPIERCABBB-BLOCK	JAN80/MAY80/SEP80/	(ADD) M
671679	ATALDATS	SEP80/ OCT80/	(ADD) M
671679	PHEMOFTINALRPT	OCT80/ NOV80/	(ADD) M
672578	PHINSTQUINERTAWELD	SEP78/OCT78/DEC78/MAY79	QQ
672578	MEASUPLHTELDMARA	DEC78/APR79/JUN79/APR80	QQ
672578	ACQUSYSTCNTLMHWRL	JUN79/AUG79/SEP79/FEB80	QQ
672578	DEVSTTWFRAUDNTMACHNTL	SEP79/FFB80/FEH80/MAR80	QQ
672578	FINALRPT	MAR80/MAY80 AUG80/	QQ
672578	PREPPROCPKG	JAN78/JAN78/MAY78/AUG78	QQ
672578	ANARUCUTRACT	JUN78/JUN78/AUG78/SEP78	QQ
673476	SELUNGUDEFVMUNITNSPHQJ	SEP76/SEP76/OCT76/OCT76	M
673476	SELRELGCONFGPS	OCT76/OCT76/NOV76/NOV76	M
673476	INVESTSELGOCAFAC	NOV76/NOV76/DEC76/DEC76	M
673476	DECTRITITES+THEIRIMPACT	APR78/APR78/MAY78/MAY78	M
673478	DEVBASICCOMPUTERPROG	MAY78/MAY78/SEP78/SEP78	M
673478	DEV+TESTNCNTL TOOL+SHAREPTS PROG	AUG78/AUG78/NOV78/NOV78	M
673479	PREPMOCOVERCINPROCEDURES	DEC78/FFB79/JUN79/JUN79(ADD)	M
673479	PREPMSCOMPDOC	MAY79/APR79/SEP80/	(ADD) M
673479	PREPNSPT	JUL79/JUL79/SEP80/	(ADD) M
673480	DATABASESTRUCT	OCT80/ JAN81/	M
673480	TFUL/OUTPUTFORMATS	NOV80/ FFB81/	M
673480	DEFMATRICS	JAN81/ MAR81/	M
673480	USENUATPHASESYE	OCT80/ JUL81/	M
673480	DOC	JUN81/ SEP81/	M
673480	DEMUAFINALRPT	AUG81/ OCT81/	M
673479	RCPIOFFJNDS	OCT78/OCT78/OCT78/OCT78	M
673479	PLACECUTRACTPIASKAARC	DEC78/DEC78/APR79/MAY79	M
673479	PLACECUTRACTMACHEVAL	MAR79/MAY79/JUL79/NOV79	M
673479	CONDMACTSTUDIES	JUL79/DEC79/SEP80/	M
673479	PREPSPEC	JAN80/ JUN80/	M
673479	FINALRPT	JUN80/ SEP80/	M
673480	PLACECUMT	MAY80/MAY80/NOV80/	M
673480	CONDUCTHACHSTIMYS	DEC80/ MAR81/	M
673480	FINALTECHRT	MAR81/ JUL81/	M
675976	RCPTUFFJNDS	MAY76/MAY76/MAY76/MAY76	M
675976	RCPTUFFADDFUNDS	JUL77/NOV77/JUL77/NOV77(ADD)	M
675976	PLACECUIT+NORVISINDUST	MAY76/JAN78/JUN76/FEH78	M
675976	MFGTOOL	JUN76/AUG78/AUG76/AUG78	M
675976	TOCHTRYJUT	JUL76/OCT78/AUG76/NOV78	M
675976	FORGE+ISPCPTPS	AUG76/NOV78/AUG76/NOV78	M
675976	FINISHPIW+MACRUPTS	SEP76/ DEC76/	(DEL) M
675976	FINALINSPCPTPS	JAN77/ JAN77/	(DEL) M
675976	PREPFINALRPT	JAN77/DEC79/MAY78/DEC79	M

SAMPLE OF HOW MILESTONE DATA IS EXTRACTED FROM THE MILESTONE DATA BASE PROGRAM FOR NOV 79

1240=400078	AWARDCONTRACT(PHASE3)	NOV79/	(DEL)	
1440=400080	FINALREPORT	AUG79/	NOV79/	(DEL)
2340=401275	PREPREFIMDSGNCRITERIA	JAN79/JAN79	NOV79/	(ADD)
2360=401275	HAZARDSANALYSIS	FEB76/FEB76	NOV79/	
3480=405179	EVALOFINSTRUMENTATION	SEP79/	NOV79/	
4020=405474	SHIPMACHTOARRADCOM	NOV79/	NOV79/	(ADD)
6360=411473THRU76	DSGNPROCINSTALLREVEQUIP	DEC77/DEC77	NOV79/	(ADD)
9200=411475	RPT	OCT78/OCT78	NOV79/	(ADD)
10560=411476	EVALOFSULFIDEMONITOR	MAR76/MAR76	NOV79/	(ADD)
10580=411476	EVALOFTOTCARBONMONITOR	MAR76/MAR76	NOV79/	(ADD)
13380=416379	EXECUTIONOFTESTPLN	JUN79/JUN79	NOV79/	
13400=416379	FIRINGTEST(ProvGRD)	OCT79/	NOV79/	
14480=421177	INSTALLPROTOCNTLSYSTFOREVAL	DEC78/DEC78	NOV79/	
15060=421478	FINALRPTRECSCHOFPREPUSEMEAS	OCT79/	NOV79/	
15580=421479	FINALRPT	AUG79/	NOV79/	
15620=421479	TEST+EVAL	AUG79/	NOV79/	
15720=421479	ENGRREVIEW	SEP79/SEP79	NOV79/	(ADD)
16180=421574	PROTOCNTLSYSTACCPD	JUN77/JUN77	NOV79/	
18080=425277	PILOTPLANTRACTVAROPT	JUN79/	NOV79/	(DEL)
18140=425278	PRODSIMMERPROC	MAR79/MAR79	NOV79/	(DEL)
18220=425278	PILOTPLANTPREPOFSTDHNXBATCH	OCT79/	NOV79/	(ADD)
20380=428179	SURVEYGASUSAGEATRAAP	AUG79/	NOV79/	
21260=428579	TEST+EVAL	FEB79/FEB79	NOV79/	(ADD)

21280=428579	GEOMETRIC EFFECTS	FEB79/FEB79NOV79/	(ADD)	
23040=431078	FINALRPT	SEP79/	NOV79/	
23060=431079	EVAL+OPTOFPROC	SEP79/	NOV79/	(ADD)
23080=431079	PROVEOUTCONTENDURRUNS	OCT79/	NOV79/	(ADD)
23460=431177	SHIPTOLOADPLANT	JAN79/JAN79NOV79/		
23760=432279	INTERIMRPT1, FY78EFFORT	JUN79/JUN79NOV79/		
24820=433776	GATORINSITUBONDING	AUG79/AUG79NOV79/	(ADD)	
25200=433876	PROTO-DSGNCOMPL	MAY79/	NOV79/	
28200=446678	HODAUTOMELTSYST	OCT79/	NOV79/	
28260=446678	PILOTLINETEST	OCT79/	NOV79/	
28780=446980	RECVDFFUNDS	NOV79/	NOV79/	(ADD)
29500=450878	HAZARDANAL	MAY79/MAY79NOV79/	(ADD)	
30600=655379	PREFORMPRODLINETST	NOV79/	NOV79/	
33100=668178	INSPRITARYFORGINGS	JUL79/AUG79NOV79/		
33220=668178	CONDUCTINVEST	SEP78/OCT78NOV79/		
33380=668278	DSGNLINE+DATACOLLECT	JUN79/JUN79NOV79/		
33740=668378	PENETCHARACTER	NOV78/DEC78NOV79/		
34220=671679	CONFTESTOFMATHMODFORNOSING	JUL79/	NOV79/	(ADD)
34340=672578	MEASOFPERTWELD PARA	APR79/APR79NOV79/		
34880=675976	PREPFINALRPT	DEC78/DEC78NOV79/		

SAMPLE OF HOW MILESTONE DATA IS EXTRACTED FROM THE MILESTONE DATA BASE PROGRAM FOR NOV 79

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2920=404178	TESTPROTOSTASATMAAP	NOV79/	JAN80/	(ADD)
3500=405179	DOC+FINALRPT	NOV79/	DEC79/	
4020=405474	SHIPMACHTOARRADCOM	NOV79/	NOV79/	(ADD)
12040=412479	TOOL+FIXTURESPECS	NOV79/		
13420=416379	PRODPROCDSGNS	NOV79/	DEC79/	
15280=421479	PROCPILOTPLANTFAC(RAAP)	NOV79/	JAN80/	(ADD)
15520=421479	HAZARDANAL	NOV79/	FEB80/	
15740=421479	INVESTIGATESTDYS	NOV79/	JUN80/	(ADD)
15940=421479	TSTOFEQUIP&MATL(BAAP)	NOV79/	SEP80/	(ADD)
16600=422377	FABPROPCHGS	NOV79/	DEC79/	
18260=425278	PILOTPLANTPROCVARSTDYFORHMX	NOV79/	MAR80/	(ADD)
20300=428179	SELOFINSULTYPE+APPL	NOV79/	JAN80/	
20420=428179	EVALCOALGASFORUSEINRAAPPROC	NOV79/	MAY80/	
20460=428179	HAZARDSANAL	NOV79/	APR80/	
23100=431079	PRODINCORP	NOV79/	JAN80/	(ADD)
23120=431079	PHY+CHEMTESTSOFPROM	NOV79/	FEB80/	(ADD)
23580=431279	HAZARDSANALYSIS	NOV79/	JUL80/	
24120=433579	FABPROCTOOLING	NOV79/		
27400=444978	PROCEVAL	NOV79/	APR80/	(DEL)

28280=446678	TECHRPT(INTERIM)	NOV79/	DEC79/
28340=446679	HAZARDSANALYSIS	NOV79/	JUN80/
28780=446980	RECVDFUNDS	NOV79/	NOV79/ (ADD)
28800=446980	BUILDSYSTPROTO(DUAL)	NOV79/	MAY80/ (DEL)
29100=447479	LAB/BENCHSCALESTDY	NOV79/	JUL80/
29120=447479	HAZARDANL	NOV79/	JUL80/
29220=448179,80	PURCHASEEQUIP	NOV79/	MAR80/
30600=655379	PREFORMPRODLINETST	NOV79/	NOV79/
33140=668178	WRITEFINALRPT	NOV79/	JAN80/
33340=668278	DEBUG+TESTCOMPUTERIZEDSIMUL	NOV79/	JAN80/
35000=678178	WRITEFINALRPT	NOV79/	JAN80/
35120=678178	WRITEFINALRPT	NOV79/	DEC79/

SAMPLE OF HOW MILESTONE DATA IS EXTRACTED FROM THE MILESTONE DATA BASE PROGRAM FOR DEC 79

2380=401275	GUNFIRINGS	DEC79/	DEC79/	
3380=405075	DELIVERYINSTALL+PROVEPROTOEQUIPATLP	DEC79/	JUN80/	
3400=405075	FINALIZETECHDATAPKG	DEC79/	JUN80/	
4120=405979	INSTALLATION	DEC79/	JAN80/	
4420=406479	SAFETYTESTSYSTEM	DEC79/	AUG80/	
9360=411475	HAZARDSANAL+ONLINEEVAL	DEC79/	MAR80/	(ADD)
10100=411476	EVALOFREVPROC	DEC79/	FEB80/	(ADD)
10220=411476	FINALRPT	DEC79/	APR80/	(ADD)
12060=412479	PROGRAMMING	DEC79/		
13440=416379	FINALRPTARRADCOM	DEC79/	JAN80/	
13600=4194	PROC/FABOFTSTEQUIP	DEC79/AUG79JUL80/		
15420=421479	QUALQUANTPOLLABATEDWATERS	DEC79/	MAR80/	(ADD)
15640=421479	FINALRPT	DEC79/	MAR80/	
16640=422377	ECOANAL	DEC79/	JAN80/	
16780=422579	ADAPTATIONSTUDIES	DEC79/	AUG80/	
18100=425277	FINALRPT(FY77EFFORT)	DEC79/	JAN80/	
22460=429179	TEST	DEC79/	APR79/	
22480=429179	TESTEVAL	DEC79/	JUN80/	
24000=433279	SAMPLEFAB	DEC79/	JAN79/	
24140=433579	MFRSAMPLEHARDWARE	DEC79/		
26940=444478	PREPOFCONTRDWG	DEC79/		
27800=446079	HAZARDSANAL	DEC79/	NOV80/	
28740=446979	DEBUG+EVALCONCEPTMODELS	DEC79/	JAN80/	(ADD)
32060=603479	CONDUCTCHIPRECYCLEEFFORT	DEC79/	OCT80/	(ADD)
33240=608178	PREPECOMICANAL	DEC79/	JAN80/	
33800=668378	PROJCOMPL	DEC79/	MAR80/	
33820=668378	DOFMFINALRPT	DEC79/	APR80/	

SAMPLE OF HOW MILESTONE DATA IS EXTRACTED FROM THE MILESTONE DATA BASE PROGRAM FOR DEC 79

	1080=400077	MONITORMULTITOOLLOADERPROG	JUL77/JUL77DEC79/	(ADD)	
	1280=400078	ASSEMTEST+MODIFY	SEP79/	DEC79/	(DEL)
	2380=401275	GUNFIRINGS	DEC79/	DEC79/	
	3500=405179	DOC+FINALRPT	NOV79/	DEC79/	
	4100=405979	EQUIPMOD	SEP79/	DEC79/	
	8820=411475,76	PILOTPLANTINSTALL+EVAL	OCT77/NOV77DEC79/	(ADD)	
	11780=411477	IMPLPROG	SEP77/AUG78DEC79/		
135	13420=416379	PRODPROCDSGNS	NOV79/	DEC79/	
	14500=421177	COMPL+EVALDATAFRONLINEPROCCNTLOPER	SEP79/	DEC79/	
	15400=421479	ETABPROCWATERSPECSQUAL+QUANT(KAAP)	AUG79/AUG79DEC79/	(ADD)	
	15500=421479	TEST+EVALSTUDIESANAL+ECOEVALDATA	OCT79/	DEC79/	
	16060=421478	FINALRPT	OCT79/	DEC79/	(ADD)
	16200=421574	TDPCMPL	JAN79/JAN79DEC79/		
	16600=422377	FABPROPCHGS	NOV79/	DEC79/	
	17460=423778	FINALRPT+HAZARDSANAL	MAR79/MAR79DEC79/	(ADD)	
	17740=424978	PILOTPLANTOPER	JUL79/	DEC79/	(DEL)
	17760=424978	ECOEVAL	AUG79/	DEC79/	(DEL)
	18700=4267 77,78	HAZARDSANAL	JAN79/FEB79DEC79/		
	19140=428077	FINALRPT	SEP79/	DEC79/	(ADD)
	19780=428177	PREPFINALRPT	APR79/APR79DEC79/		
	21060=428577	REPORTPREP+DISTRIBUTION	FEB77/AUG77DEC79/		
	22420=429179	ANALYTICALSTUDIES	JUN79/JUN79DEC79/		

22440=429179	TESTPLANDEV	SEP79/	DEC79/	
22540=430979	ENGRREV&GENPROCSTDY	JUL79/JUL79	DEC79/	
23980=433279	INVESTIGATEALTERNATIVES	SEP79/	DEC79/	
26060=436277	FINALRPT	JUL79/JUL79	DEC79/	
26760=444479	LAPPROJS	OCT79/	DEC79/	
27160=444478	RPT	SEP79/	DEC79/	
27260=4444978	FINALRPT(2TESTLOTS)	OCT79/	DEC79/	
27440=4444978	FINALRPT	OCT79/	DEC79/	
27520=4444978	FINALRPT(ADDTESTLOTS)	OCT79/	DEC79/	(ADD)
27920=446278	ENGRSTDYS	SEP78/SEP78	DEC79/	
27940=446278	HAZARDANALII	SEP78/SEP78	DEC79/	
28000=446278	PROCNGSCRUBBERTANKS+PUMPS	FEB79/FEB79	DEC79/	
28020=446278	SUBMITABSORBERDSGN+DWGS	MAY79/MAY79	DEC79/	
28280=446678	TECHRPT(INTERIM)	NOV79/	DEC79/	
28720=446979	DSGN+BUILDCONCEPTMODELS	SEP79/	DEC79/	(ADD)
29040=447278	PREPARESCOPEOFWORK	FEB79/FEB79	DEC79/	
29520=450878,79	PILOTPLANTDSGNCRIT+DSGN	JAN79/JAN79	DEC79/	
29540=450878	FINALRPTFY78	OCT79/	DEC79/	
30080=621175	TECHRPT(HCCCPROC)	FEB78/MAY78	DEC79/	(ADD)
31160=657174	FINALRPT	OCT78/NOV78	DEC79/	(ADD)
31440=662876	TDP	AUG77/AUG77	DEC79/	
31460=662876	FINALRPT	MAY79/MAY79	DEC79/	
31860=664077	X-RAY+BALLISTICTESTOFPRECLINERS	NOV78/DEC78	DEC79/	(ADD)
32640=663479	PLACECONTRACTFORCHIPRECYCLE	FEB79/FEB79	DEC79/	(ADD)
34360=672578	ACQUISYSTCNTLHDWR	JUN79/AUG79	DEC79/	
35120=678178	WRITEFINALRPT	NOV79/	DEC79/	

*****FY 79MMT PROGRAM*****

PROJ TOTAL AUTH	IN HOUSE			CONTRACT			GOCO			OGA		
	COMM	OBLIG		COMM	OBLIG	DATE	COMM	OBLIG	DATE	COMM	OBLIG	DATE
4000 1614000 1249000 1249000 % OBLIG = 100.0 DIVISION IS ESP	0	0		TECH AREA IS LAP			365000	365000		0	0	
4024 1132000 111000 111000 % OBLIG = 100.0 DIVISION IS MSD	1021000	1021000		TECH AREA IS MPTS			0	0 0		0	0	
4046 307000 237000 237000 % OBLIG = 100.0 DIVISION IS ESP	0	0 0		TECH AREA IS LAP			70000	70000		0	0	
4051 157000 157000 157000 % OBLIG = 100.0 DIVISION IS ESP	0	0 0		TECH AREA IS PROP+EXPL			0	0 0		0	0	
4059 250000 25000 25000 % OBLIG = 100.0 DIVISION IS ESP	0	0 0		TECH AREA IS PROP+EXPL			225000	225000		0	0	
4062 507000 191000 191000 % OBLIG = 39.8 DIVISION IS ESP	305000	0	9/30/80	TECH AREA IS LAP			11000	11000 0		0	0	
4064 1262000 1026000 1026000 % OBLIG = 100.0 DIVISION IS ESP	195000	195000		TECH AREA IS LAP			41000	41000		0	0	
4084 121000 96000 96000 % OBLIG = 100.0 DIVISION IS MSD	0	0 0		TECH AREA IS POLLUTION			25000	25000 0		0	0	
4124 930000 132000 132000 % OBLIG = 100.0 DIVISION IS MSD	798000	798000		TECH AREA IS MPTS			0	0 0		0	0	
4137 205000 114000 114000 % OBLIG = 100.0 DIVISION IS ESP	85000	85000		TECH AREA IS LAP			6000	6000 0		0	0	
4163 661000 399000 399000 % OBLIG = 100.0 DIVISION IS ESP	0	0 0		TECH AREA IS LAP			262000	262000		0	0	
4189 533000 58000 58000 % OBLIG = 36.7 DIVISION IS MSD	375000	375000		TECH AREA IS MPTS			0	0 0 0		100000	100000 0	
4194 327000 311000 311000 % OBLIG = 100.0 DIVISION IS MSD	0	0 0		TECH AREA IS PROP+EXPL			16000	16000 0		0	0 0	
4214 1269000 716000 716000 % OBLIG = 100.0 DIVISION IS ESP	20000	20000		TECH AREA IS POLLUTION			533000	533000		0	0	

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4225	350000	120000	120000		0	0	230000	230000	0	0
% OBLIG E	100.0	DIVISION IS ESP		TECH AREA IS POLLUTION						
4263	329000	304000	304000		25000	25000		0	00 0	00
% OBLIG E	100.0	DIVISION IS ESP		TECH AREA IS LAP						
4281	1345000	572000	572000		0	0	773000	773000	0	0
% OBLIG E	100.0	DIVISION IS ESP		TECH AREA IS ENERGY						
4285	420000	285000	285000		0	0		0	00	135000
% OBLIG E	100.0	DIVISION IS ESP		TECH AREA IS SAFETY						
4288	663000	633000	633000		0	0	10000	10000	0	0
% OBLIG E	100.0	DIVISION IS ESP		TECH AREA IS SAFETY						
4291	235000	155000	155000		80000	80000		0	00	0
% OBLIG E	100.0	DIVISION IS ESP		TECH AREA IS SAFETY						
4309	848000	384000	384000		0	0	464000	464000	0	0
% OBLIG E	100.0	DIVISION IS ESP		TECH AREA IS PROP+EXPL						
4310	483000	189000	189000		0	0	294000	294000	0	0
% OBLIG E	100.0	DIVISION IS ESP		TECH AREA IS PROP+EXPL						
4312	261000	80000	80000		0	0	181000	181000	0	0
% OBLIG E	100.0	DIVISION IS ESP		TECH AREA IS LAP						
4322	609000	410000	410000		0	0	199000	199000	0	0
% OBLIG E	100.0	DIVISION IS ASD		TECH AREA IS MPTS						
4332	83000	5000	5000		78000	78000		0	00	0
% OBLIG E	100.0	DIVISION IS MSD		TECH AREA IS MPTS						
4335	411000	111000	111000		300000	300000		0	00	0
% OBLIG E	100.0	DIVISION IS MSD		TECH AREA IS MPTS						
4341	742000	136000	136000		0	0	606000	606000	0	0
% OBLIG E	100.0	DIVISION IS ESP		TECH AREA IS PROP+EXPL						
4444	355100	295000	295000		37000	0 4/30/80	23100	23100	0	0
% OBLIG E	89.6	DIVISION IS MSD		TECH AREA IS MPTS						
4460	236000	122000	122000		0	0	114000	114000	0	0
% OBLIG E	100.0	DIVISION IS ESP		TECH AREA IS PROP+EXPL						
4462	928000	132000	132000		0	0	396000	396000	0	0
% OBLIG E	100.0	DIVISION IS ESP		TECH AREA IS PROP+EXPL						

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4466	461000	371000	371000		90000	90000			0	0	0	0	0
\$ OBLIG	=	100.0	DIVISION IS ESP		TECH AREA IS PROP+EXPL								
4469	1150000	279000	279000		871000	871000			0	0	-	0	0
% OBLIG	=	100.0	DIVISION IS ESP		TECH AREA IS LAP								
4474	175000	75000	75000		0	0	0		100000	100000		0	00
% OBLIG	=	100.0	DIVISION IS ESP		TECH AREA IS ENERGY								
4498	1147000	88000	88000		4000	4000			1055000	1055000		0	0
% OBLIG	=	100.0	DIVISION IS MSD		TECH AREA IS LAP								
4508	357000	68000	68000		0	0	0		289000	289000		0	0
% OBLIG	=	100.0	DIVISION IS ESP		TECH AREA IS PROP+EXPL								
6553	95000	67000	67000		28000	28000			0	0		0	0
% OBLIG	=	100.0	DIVISION IS MSD		TECH AREA IS MPTS								
6634	942000	242000	242000		300000	0	5/30/80		0	0		0	0
% OBLIG	=	44.6	DIVISION IS MSD		TECH AREA IS MPTS								
6682	170000	170000	170000		0	0	0		0	0		0	0
% OBLIG	=	100.0	DIVISION IS MSD		TECH AREA IS MPTS								
6683	146000	146000	146000		0	0			0	0		0	0
% OBLIG	=	100.0	DIVISION IS MSD		TECH AREA IS MPTS								
6716	306000	36000	36000		270000	270000	0		0	0		0	0
% OBLIG	=	100.0	DIVISION IS MSD		TECH AREA IS MPTS								
6736	256000	81000	81000		175000	175000			0	0		0	0
% OBLIG	=	100.0	DIVISION IS MSD		TECH AREA IS MPTS								
6738	181000	132000	132000		49000	49000	0		0	0		0	0
% OBLIG	=	100.0	DIVISION IS MSD		TECH AREA IS MPTS								
TOTALS	22139100	10510000	10510000		5106000	4146500			6288100	6288100		235000	235000

DIVISIONS

ASD			NFD			ESP			MSD			
COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	
410000	410000	100.0	0	0	-I	8019000	8019000	100.0	2081000	2081000	100.0	IN HOUSE
199000	199000	100.0	0	0	-I	4970000	4970000	100.0	1119100	1119100	100.0	GOCO
0	0	-I	0	0	-I	1671000	1366000	81.7	3035000	2760500	80.4	CONTRACTS

0	0	-1	0	0	-1	135000	135000	100.0	400000	100000	100.0	OGA
609000	609000	100.0	0	0	-1	14795000	14490000	97.9	635100	6060600	90.0	TOTAL

TECH AREAS

IN HOUSE				CONTRACTS				GOCO				OGA			
COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	
3967000	3967000	100.0	1485000	1180000	79.5	1991000	1991000	100.0	0	0	-1	LAP			
1996000	1996000	100.0	3431000	2756500	80.3	222100	222100	100.0	100000	100000	100.0	HPTS			
932000	20000	2.1	20000	20000	100.0	788000	788000	100.0	0	0	-1	POLLUTION			
1073000	1073000	100.0	80000	80000	100.0	10000	10000	100.0	135000	135000	100.0	SAFETY			
1895000	1895000	100.0	90000	90000	100.0	2404000	2404000	100.0	0	0	-1	PROP+EXP			
647000	647000	100.0	0	0	-1	873000	873000	100.0	0	0	-1	FUZE			

TOTAL \$ OBLIG.= 95.6 TOTAL \$ OBLIG. = 21159600

TOTAL % OBLIG

CONTRACT= 80.8

GOCO = 100.0

OGA = 100.0

TOTAL \$ TO BE OBLIGATED BY:

MONTH	CONTRACT	GOCO	OGA	TOTAL
JAN	0	0	0	0
FEB	0	0	0	0
MAR	0	0	0	0
APR	37000	0	0	37000
MAY	300000	0	0	300000
JUNE	0	0	0	0
JULY	0	0	0	0
AUG	0	0	0	0
SEPT	305000	0	0	305000
OCT	0	0	0	0
NOV	0	0	0	0
DEC	0	0	0	0

***** A POINT SPECIFIED IN A CALL TO PLOT LIES OUTSIDE THE PLOTTING AREA. PEN MOVEMENT TERMINATED AT BOUNDARY

TOTAL \$ TO BE CARRIED OVER TO FY 80:

MONTH	CONTRACT	GOCO	OGA	TOTAL
JAN	0	0	0	0
FEB	0	0	0	0
MAR	0	0	0	0
APR	0	0	0	0
MAY	0	0	0	0
JUNE	0	0	0	0
JULY	0	0	0	0
AUG	0	0	0	0
SEPT	0	0	0	0
OCT	0	0	0	0
NOV	0	0	0	0
DEC	0	0	0	0

*****FY ROMMT PROGRAM*****

PROJ TOTAL AUTH	IN HOUSE			CONTRACT			GOCO			OGA		
	COMM	OBLIG		COMM	OBLIG	DATE	COMM	OBLIG	DATE	COMM	OBLIG	DATE
4000 250000 230000 230000 % OBLIG = 100.0 DIVISION IS ESP	0	0 0		20000	20000		0	0 0				
4033 153000 153000 153000 % OBLIG = 100.0 DIVISION IS ESP	0	0	TECH AREA IS LAP	0	0	TECH AREA IS PROP+EXPL	0	0	0	0	0	
4037 236000 30000 30000 % OBLIG = 100.0 DIVISION IS ESP	0	0 0	TECH AREA IS PROP+EXPL	206000	206000		0	0 0		0	0	
4061 260000 63000 63000 % OBLIG = 100.0 DIVISION IS ESP	0	0 0	TECH AREA IS PROP+EXPL	197000	197000		0	0 0		0	0 0	
4062 884000 9000 9000 % OBLIG = 1.0 DIVISION IS ESP	875000	0 9/30/80	TECH AREA IS LAP	0	0 0		0	0 0		0	0 0	
4084 111000 111000 111000 % OBLIG = 100.0 DIVISION IS MSD	0	0 0	TECH AREA IS PROP+EXPL	0	0 0		0	0 0		0	0 0	
4137 67000 67000 67000 % OBLIG = 100.0 DIVISION IS ESP	0	0	TECH AREA IS LAP	0	0 0		0	0 0		0	0 0	
4189 1248000 404000 404000 % OBLIG = 32.4 DIVISION IS MSD	0	0 0	TECH AREA IS MPTS	644000	0 9/30/80		200000	0 9/30/80				
4200 29000 29000 29000 % OBLIG = 100.0 DIVISION IS ESP	0	0	TECH AREA IS PROP+EXPL	0	0		0	0 0		0	0	
4210 450000 112000 112000 % OBLIG = 100.0 DIVISION IS ESP	0	0	TECH AREA IS PROP+EXPL	338000	338000		0	0 0		0	0	
4225 155000 84000 84000 % OBLIG = 100.0 DIVISION IS ESP	0	0 0	TECH AREA IS POLLUTION	71000	71000		0	0 0		0	0	
4226 100000 50000 50000 % OBLIG = 50.0 DIVISION IS ESP	0	0 0	TECH AREA IS POLLUTION	50000	0 8/30/80		0	0 0		0	0 0	
4231 250000 88000 88000 % OBLIG = 100.0 DIVISION IS ESP	0	0 0	TECH AREA IS POLLUTION	162000	162000		0	0 0		0	0 0	
4236 612000 130000 130000 % OBLIG = 21.6 DIVISION IS ESP	459000	0 9/30/80	TECH AREA IS LAP	23000	23000		0	0 0 0 0				

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	4266	345000	345000	345000	0	00			0	00	0
	% OBLIG	=	100.0	DIVISION IS NFD	TECH AREA IS FUZE						
	4281	1234000	315000	315000	0	00		919000	660000	7/30/80	
	% OBLIG	=	79.0	DIVISION IS ESP	TECH AREA IS ENERGY						
	4285	408000	408000	408000	0	00			0	00	
	% OBLIG	=	100.0	DIVISION IS ESP	TECH AREA IS SAFETY						
	4288	767000	767000	767000	0	0			0	00	
	% OBLIG	=	100.0	DIVISION IS ESP	TECH AREA IS SAFETY						
	4291	100000	100000	100000	0	0			0	0	
	% OBLIG	=	100.0	DIVISION IS ESP	TECH AREA IS SAFETY						
	4309	3726000	347000	347000	2396000	0 9/30/80		983000	0 7/30/80		
	% OBLIG	=	9.3	DIVISION IS ESP	TECH AREA IS PROP+EXPL						
	4310	278000	278000	278000	0	0			0	0	
	% OBLIG	=	100.0	DIVISION IS ESP	TECH AREA IS PROP+EXPL						
I	4312	279000	153000	153000	0	00		126000	126000		
	% OBLIG	=	100.0	DIVISION IS ESP	TECH AREA IS LAP						
	4322	502000	257000	257000	8000	0 1/30/80		237000	175000	8/30/80	
	% OBLIG	=	86.1	DIVISION IS ASD	TECH AREA IS MPTS						
	4341	583000	170000	170000	0	00		413000	0 7/30/80		
	% OBLIG	=	29.2	DIVISION IS ESP	TECH AREA IS PROP+EXPL						
	4462	850000	341000	341000	0	0		509000	509000		
	% OBLIG	=	100.0	DIVISION IS ESP	TECH AREA IS PROP+EXPL						
	4469	350000	225000	225000	0	0		125000	125000		
	% OBLIG	=	100.0	DIVISION IS ESP	TECH AREA IS LAP						
	4498	392000	110000	110000	182000	0 9/30/80		100000	100000		
	% OBLIG	=	53.6	DIVISION IS MSD	TECH AREA IS LAP						
	4508	506000	172000	172000	0	00		334000	334000		
	% OBLIG	=	100.0	DIVISION IS ESP	TECH AREA IS PROP+EXPL						
	6736	340000	155000	155000	160000	009/30/80		0	0	25000	0 7/31/80
	% OBLIG	=	45.6	DIVISION IS MSD	TECH AREA IS MPTS						
	6738	297000	117000	117000	180000	0 9/31/80		0	0	0	0
	% OBLIG	=	39.4	DIVISION IS MSD	TECH AREA IS MPTS						

TOTALS	\$15762000	\$5820000	\$5820000	4260000	0	\$5457000	3025300	225000	0
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DIVISIONS

ASD			NFD			ESP			MSD			
COMM	OBLIG	%OBLIG	COMM	OBLIG	SUBLIG	COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	
257000	257000	100.0	345000	345000	100.0	4321000	4321000	100.0	897000	897000	100.0	IN HOUSE
237000	175000	73.8	0	0	-I	4476000	2750300	61.4	744000	100000	13.4	GOCO
8000	0	0.0	0	0	-I	3730000	0	0.0	522000	0	0.0	CONTRACTS
0	0	-I	0	0	-I	0	0	-I	225000	0	0.0	OGA
502000	632000	86.1	345000	345000	100.0	12527000	7071300	56.4	2388000	997000	41.8	TOTAL

TECH AREAS

IN HOUSE				CONTRACTS				GOCO				OGA	
COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	LAP MPTS POLLUTION	
924000	924000	100.0	1516000	0	0.0	394000	373300	94.7	0	0	-I		
933000	933000	100.0	348000	0	0.0	881000	175000	19.9	225000	0	0.0		
222000	0	0.0	0	0	-I	283000	233000	82.3	0	0	-I	POLLUTION	
1275000	1275000	100.0	0	0	-I	0	0	-I	0	0	-I	SAFETY	
1806000	1806000	100.0	2396000	0	0.0	2980000	1584000	53.2	0	0	-I	PROP+EXP	
345000	345000	100.0	0	0	-I	0	0	-I	0	0	-I	FUZE	
315000	315000	100.0	0	0	-I	919000	660000	71.8	0	0	-I	ENERGY	

TOTAL % OBLIG.= 56.1 TOTAL \$ OBLIG. = 8845300

TOTAL % OBLIG.

CONTRACT= 0.0

GOCO = 55.4

OGA = 0.0

TOTAL \$ TO BE OBLIGATED BY:

MONTH	CONTRACT	GOCO	OGA	TOTAL
JAN	0	0	0	0
FEB	0	0	0	0
MAR	0	0	0	0
APR	0	0	0	0
MAY	0	0	0	0
JUNE	0	0	0	0
JULY	8000	1655000	25000	1688000
AUG	0	112000	0	112000
SEPT	4252000	644000	200000	5096000
OCT	0	0	0	0
NOV	0	0	0	0
DEC	0	0	0	0

***** A POINT SPECIFIED IN A CALL TO PLOT LIES OUTSIDE THE PLOTTING AREA. PEN MOVEMENT TERMINATED AT BOUNDARY

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TOTAL \$ TO BE CARRIED OVER TO FY 81:

MONTH	CONTRACT	GOCO	OGA	TOTAL
JAN	0	0	0	0
FEB	0	0	0	0
MAR	0	0	0	0
APR	0	0	0	0
MAY	0	0	0	0
JUNE	0	0	0	0
JULY	0	0	0	0
AUG	0	0	0	0
SEPT	0	0	0	0
OCT	0	0	0	0
NOV	0	0	0	0
DEC	0	0	0	0

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